



# **NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

## **THESIS**

**BALLISTIC MISSILE DEFENSE IN THE MIDDLE EAST**

by

Malik M. Shahkaram

March 2019

Thesis Advisor:  
Second Reader:

James A. Russell  
Glenn E. Robinson

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**BALLISTIC MISSILE DEFENSE IN THE MIDDLE EAST**

Malik M. Shahkaram  
Major, United States Army  
BA, University of Oklahoma, 2010  
MA, University of Texas at El Paso, 2011

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requirements for the degree of

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from the

**NAVAL POSTGRADUATE SCHOOL  
March 2019**

Approved by: James A. Russell  
Advisor

Glenn E. Robinson  
Second Reader

Afshon P. Ostovar  
Associate Chair for Research  
Department of National Security Affairs

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## **ABSTRACT**

Ballistic missile proliferation is a significant concern in the Middle East. Israel, Saudi Arabia, and Jordan have closely associated themselves with the United States. These nations are targets of American adversaries such as Iran, Syria, and terrorist groups. Findings of this study revealed the following: First, the U.S.'s role in theater ballistic missile defense (TBMD) development and implementation in the Middle East is defined by its shift of the defense systems from its homeland to the region. Second, the possible avenues that could facilitate the development of a comprehensive and integrated TBMD system include facilities, training, exercises, and logistic support. Third, the current challenges in Israel, Saudi Arabia, and Jordan that are hindering the development include financial constraints, obligations associated with the creation of such a defense system, domestic politics, foreign policy, inefficiency associated with such a system, and strategic asymmetries. Fourth, the following vital ways these countries could cooperate include the transfer of advanced defense technologies, enhanced operational coordination, multilateral planning, alliance coordination mechanism, and intelligence and surveillance sharing.

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

BMD	ballistic missile defense
GCC	Gulf Cooperation Council
IS	Islamic State
ISIS	Islamic State of Iraq and Syria
km	kilometers
kg	kilograms
NATO	North Atlantic Treaty Organization
PAC	Patriot Advanced Capabilities
RADAR	Radio Assisted Detection and Ranging
RAND	Research and Development
SWOT	strengths, weaknesses, opportunities, and threats
TBM	theatre ballistic missile
TBMD	theater ballistic missile defense
THAAD	Terminal High Altitude Area Defense
UAE	United Arab Emirates

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## I. INTRODUCTION

Over the past three decades, two constant issues have served as continuous determinants of security in the Middle East. The first issue is the region's persistent pursuit of peace. The second issue is perceptions of threat in the region as countries strive against each other for greater influence. Consequently, anxiety about their neighbors has spurred countries to develop and execute plans for modernization and acquisition of arms, as well as to conduct defense-related preparations.<sup>1</sup> Ballistic missile proliferation is a field in which this trend has become quite evident.

This thesis aims to demonstrate the significant role of theater ballistic missile defense (TBMD) in ensuring the protection and security of three Middle East states: Israel, Saudi Arabia, and Jordan. In addition, the findings of this study are essential in providing guidance concerning the development of strategies to enhance TBMD in the region. This research discusses the key security challenges that the ballistic missiles pose to the Middle East region and their impact on a regional missile defense architecture.

The security situation in the Middle East is characterized by considerable hostility; however, the first Gulf War (1990–1991) was a turning point that changed the nature of the security conditions in the region.<sup>2</sup> The first Gulf War was characterized by extreme political and military tensions, which were high enough to create a number of social and security risks in the region. Consequently, the Arab-Israeli confrontation was no longer the main source of conflict in the region. Specifically, the importance of TBMD emerged as a prevailing threat in the region.

The first Gulf War was a demonstration of what came to be referred to as a “missile war,”<sup>3</sup> which changed the art of war and fighting substantially in the region, as illustrated

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<sup>1</sup> Jacob Heim, *Missiles for Asia? The Need for Operational Analysis of U.S. Theater Ballistic Missiles in the Pacific* (Santa Monica, CA: Rand Corporation, 2016), <https://apps.dtic.mil/dtic/tr/fulltext/u2/1014095.pdf>, 4.

<sup>2</sup> Heim, *Missiles for Asia?*, 7.

<sup>3</sup> Heim, 7.

by the role of air and missile power in this war.<sup>4</sup> For instance, the best example of this role and its influence on the course of the war is the decision by Iraq to launch tens of ballistic missiles attacks on both Israel and Saudi Arabia.<sup>5</sup> The significance of these events to this study is that they played an instrumental role in the demonstration of starting points for the conflict between U.S. allies such as Israel, Saudi Arabia, and Jordan. This act demanded a response from the United States and the coalition forces, which in return, launched about 300 missiles against Iraq. Some of these missiles launched from land-based U.S. Patriot ballistic missile defense (BDM) systems, while others were from U.S. Aegis surface ships and submarines, and the coalition of allies also air-launched cruise missiles against Iraq.<sup>6</sup> Notably, both U.S. and allied responses (in regard to the protection of Israel and Saudi Arabia) not only confirmed close associations of these countries with the United States but also led to a significant political gap between these countries and their neighbors. Not all Middle Eastern countries view the United States and European countries favorably.

Nevertheless, it is vital to understand that it was not the first time that countries in the region used ballistic missiles on each other. The Iran-Iraq war of 1980–1988, which started a decade before the first Gulf War, was another conflict in which ballistic missiles played a significant role.<sup>7</sup> During this war, the two states launched more than 600 missiles at each other’s major cities.<sup>8</sup> The War of the Cities, as it was known, was the highest point of the confrontation and was marked by two key events. The first event was Iraq’s decision to launch 189 modified Scuds on the cities of Iran.<sup>9</sup> Iran’s motivation to agree to a ceasefire between the two nations is the second event, one that helped bring peace in the region.

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<sup>4</sup> Heim, 4.

<sup>5</sup> “Making the World a Safer Place,” Missile Defense Advocacy Alliance, June 26, 2018, <http://missiledefenseadvocacy.org/intl-cooperation/saudi-arabia/>.

<sup>6</sup> Ari Kattan, *GCC Missile Defense: Obstacles on the Road to Integration* (College Park, MD: University of Maryland, 2017), <https://drum.lib.umd.edu/handle/1903/19724>, 7.

<sup>7</sup> Michael Eisenstadt, “Here’s the Most Critical Part of Iran’s Nuclear Program That Nobody is Talking About,” *Business Insider*, July 7, 2015, <https://www.businessinsider.com/irans-ballistic-missile-program-is-the-most-important-part-of-the-countrys-nuclear-program-that-nobody-is-talking-about-2015-7?IR=T>.

<sup>8</sup> Eisenstadt, “Here’s the Most Critical Part.”

<sup>9</sup> W. Andrew Terrill, “The Gulf War and Ballistic Missile Proliferation,” *Comparative Strategy* 11, no. 2 (1992):165, doi 10.1080/01495939208402869.

Nevertheless, the existence of missiles in the region threatened the fragile peace attained after the war.<sup>10</sup> As a precaution, for example, Saudi Arabia sought to effectively arm itself, as demonstrated by its acquisition of CSS-2 ballistic missiles from China.<sup>11</sup>

It is apparent that the Iran-Iraq War changed the role of ballistic missiles in the region significantly from one of acquisition and technology for deterrence to one of practical utilization on the battlefield. This war also demonstrated how such weapons could be utilized to instill civilians with fear and a sense of insecurity. Ultimately, apprehensive citizens put substantial political pressure on national governments to negotiate for peace with rivals.

The North Atlantic Treaty Organization's (NATO's) air campaign during the Balkan wars was a vital event that demonstrated Middle East missile proliferation.<sup>12</sup> Many security issues arose; they spread from European to the southern region of the Mediterranean and also the Middle East. At the time, many countries of the region feared that the international community would take similar actions against them. Many developing nations realized that the United States had supremacy that they could not match. The United States continued to spread of this power and associated technologies to its allies in the region, such as Israel, thus advancing the imbalance between nations of the Middle East.<sup>13</sup>

The spread of the U.S. TBMD systems and technologies in the Middle East has enabled nations to undermine the development of strategies that would otherwise help them be on equal footing with the major powers in the region in a potential conflict.<sup>14</sup> Additionally, other incentives have pushed nations to feel they need for the acquisition of

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<sup>10</sup> Herbert C. Kemp, "Left of Launch: Countering Theater Ballistic Missiles," Atlantic Council, July 31, 2017, <https://www.atlanticcouncil.org/publications/issue-briefs/left-of-launch>.

<sup>11</sup> Eisenstadt, "Here's the Most Critical Part."

<sup>12</sup> Jean-Loup Samaan and Guillaume Lasconjarias, "The Israeli Experience in Missile Defense: Lessons for NATO," Atlantic Council, August 12, 2013, <http://www.atlanticcouncil.org/publications/issue-briefs/the-israeli-experience-in-missile-defense-lessons-for-nato>, 5.

<sup>13</sup> David Ochmanek et al., *U.S. Military Capabilities and Forces for a Dangerous World: Rethinking the U.S. Approach to Force Planning* (Santa Monica: RAND Corporation, 2017), [https://www.rand.org/pubs/research\\_reports/RR1782-1.html](https://www.rand.org/pubs/research_reports/RR1782-1.html), 6–10.

<sup>14</sup> Kattan, *GCC Missile Defense*, 6.

ballistic missiles. One of these incentives is economic in nature. Cost benefit analyses determined that it was much cheaper to acquire ballistic missiles than maintain large conventional forces. Thus, many nations have shown interest in acquiring ballistic missiles. Consequently, defense against ballistic missiles has become a matter of great importance for the Middle East nations, which has resulted in the emergence of an offense-defense missile race in the region.

## **A. PROBLEM STATEMENT**

Countries in the Middle East including Israel, Saudi Arabia, and Jordan, have focused on the acquisition of BMD systems as allies of the United States against potential adversaries, including Syria, Iran, and Libya as well as against terrorist groups, such as Hamas in Gaza, the Islamic State (IS), and Houthis in Yemen, which are developing complicated weapons of mass destruction. Since its founding as a modern state in 1948, Israel stands out as the strongest U.S. ally in the Middle East.<sup>15</sup> As a result, it faces a considerable number of threats, particularly those emanating from its chilling relations with various Palestinian territories and the countries that support them. In addition, Syria and Iran continue to be a significant source of danger for Israel. In the case of Saudi Arabia and Jordan, the current war in Yemen has served as a platform for drawing the two states into conflict with their neighboring enemies, especially Iran. Moreover, Iran's provision of support to the Houthis rebels against the coalition led by Saudi Arabia has devastated Yemen.

Iran's Houthi proxies Scud missiles attacks against Saudi Arabia have entailed the launch of these long-range ballistic missiles. At the time, Russia has been assisting Iran in the development of its long-range land attack cruise missile program.<sup>16</sup> This program is a violation of the Intermediate-Range Nuclear Forces Treaty.<sup>17</sup> China has also developed a variety of theatre ballistic missiles (TBMs) including those with the capability of targeting

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<sup>15</sup> Ochmanek et al., *U.S. Military Capabilities*, 6–10.

<sup>16</sup> Steven A. Hildreth, *Iran's Ballistic Missile Programs: An Overview*, CRS Report No. RS22758 (Washington, DC Congressional Research Service, 2009), 2, <http://handle.dtic.mil/100.2/ADA494274>.

<sup>17</sup> Ochmanek et al., *U.S. Military Capabilities*, 20–22.

large warships. The Chinese TBMs include the M-7 (160 kilometers [km]), M-11, CSS-7, and DF 15.

In 2017, Iran proved its command of TBMs and demonstrated its willingness to utilize them against its enemies. In 2017 the Iranian Supreme Leader, Ali Khamenei, announced Iran's intentions and that Iran was limiting its range of ballistic missiles, specifically to a maximum of 2000 km,<sup>18</sup> in its future manufacturing plans.<sup>19</sup> The significance of this strategy is to enhance the chances of Iranian missiles accurately reaching their targets within the region. Khamenei's main point was that the U.S. military and its allies are within the 2000 km radius of Iranian missiles; therefore, this decision would put Iran in a much better position to stage an attack or counterattack.<sup>20</sup> By extension, the three U.S. allies, Israel, Saudi Arabia, and Jordan, are also vulnerable to attacks by Iranian missiles.

The potential of attacks by TBMs from enemy states has stirred nations in the Middle East with fear, thus making many strive to find ways of protecting themselves—missiles is an obvious choice. This reaction is illustrated by the fact that all three U.S. allies have put in place some form of effective defense mechanism, which they could utilize to counter any missile attacks.<sup>21</sup> For instance, Israel has developed an advanced TBMD system, which allows it to reduce its reliance on the United States for protection against missile attacks. However, Saudi Arabia and Jordan continue to rely on the United States due to their lack of such a system.

Countering the threats that these three nations face goes beyond the capabilities of any single nation. In such a manner, while Israel, Saudi Arabia, and Jordan are working toward the continued acquisition of defenses against missile attacks; however as of yet,

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<sup>18</sup> Kelsey Davenport, "Iran's Leader Sets Missile Range Limit," *Arms Control Today* 47, no. 10 (December 2017): 31–32.

<sup>19</sup> Anthony H. Cordesman, *Iran's Developing Military Capabilities* (Washington, DC: CSIS Press, 2005), 16–17.

<sup>20</sup> Ronald O'Rourke, *Sea-Based Ballistic Missile Defense: Background and Issues for Congress*, CRS Report No. 33745 (Washington, DC: Congressional Research Service, 2007), [https://www.everycrsreport.com/files/20070427\\_RL33745\\_cb78dab77f72a8964ab59787fe26ddf26703214d.pdf](https://www.everycrsreport.com/files/20070427_RL33745_cb78dab77f72a8964ab59787fe26ddf26703214d.pdf), 25–27.

<sup>21</sup> Ochmanek et al., *U.S. Military Capabilities*, 27–30.

none of them possesses the necessary combination of sensors, interceptors, or sufficient command and control to manage a successful defense in the case of a large-scale attack. In addition, these nations are not positioned to handle multiple quarter attacks, as it would be difficult for them to counter all possible launched TBM attacks. Additionally, the reliance on the United States is challenging because it has been focused on dealing with a myriad of threats, including threats within its own borders as well as the nuclear threats emanating from both countries and terrorist groups. For instance, North Korea has posed one of these threats based on its nuclear capabilities; it endangers American allies in the east, namely South Korea and Japan.<sup>22</sup> Furthermore, the United States must deal with the threats posed by China and Russia with their long-range missile programs, which are believed to have the capability of launching an attack on the U.S. territory.<sup>23</sup> It implies that the United States and its military power is quite stretched out and cannot provide adequate protection to all nations in need. Given this, the best solution would be the development of a combined regional missile defense in the Middle East. In such a manner, Israel, Saudi Arabia, and Jordan would have a stronger defense if they developed a joint TBMD.

## **B. BACKGROUND OF THE STUDY**

The world's highest concentration of missiles and rockets is in the Middle East.<sup>24</sup> Practically every nation in this region has deployed ballistic missiles at some point in its history. Additionally, a number of nongovernment organizations in this region own the majority of missiles. For instance, Hezbollah and Hamas both assert that they have more rockets than governments of the West combined.<sup>25</sup> The current buildup of these weapons by countries can be explained by the need to compensate for the relative weakness of

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<sup>22</sup> Ochmanek et al., 24.

<sup>23</sup> O'Rourke, *Sea-Based Ballistic Missile Defense*, 36.

<sup>24</sup> Yahya M. Sadowski, *Scuds or Butter? The Political Economy of Arms Control in the Middle East* (Washington, DC: Brookings Institution, 1993), 5.

<sup>25</sup> Patrick Devenny, "Hezbollah's Strategic Threat to Israel," *Middle East Quarterly* 13, no. 1 (January 2006): 31–38; P. J. Bowen, K. Norman, A. P. Willmore, J-M. Baguette, F. Murtin, and L. R. O. Storey, "Rocket Studies of Sporadic- E Ionization and Ionospheric Winds," *Planetary and Space Science* 12, no. 12 (1964): 1173–1177, <https://www.sciencedirect.com/science/article/pii/0032063364901631?via%3Dihub>.

Middle Eastern air forces.<sup>26</sup> Iran and Syria are the two main nations possessing the major missile power in the region, and the main target for these missiles is Israel. Also, other Gulf states (e.g., Saudi Arabia and the United Arab Emirates [UAE]) are in danger of a missile attacks by Syria and especially Iran. Consequently, this concern has further contributed to Iran's nuclearization, and this has the potential to cause a similar process in other nations. This scenario is even more likely given the long-established sense of animosity between nations and oppressing politics in the region.

Two key events were the sources of origin for the spread of missiles in the Middle East. The first key event was the Suez Canal crisis of 1956. The second event, intertwined with the first, was Israel's plan to develop an arsenal of nuclear and missile weapons, a plan that was executed with the support of France and Britain. They supported Israel's decision to develop such an arsenal due to their interest in occupying the Suez Canal and in joining forces with Israel in an attack against Egypt.<sup>27</sup> The same year, France agreed to arm Israel with a 24-megawatt reactor as well as a chemical processing plant located in Dimona. These events were significant because they created the foundation for Israel's nuclear armament project, and in the 1960s, Israel managed to develop its first ballistic missile though the technology provided by the French.<sup>28</sup>

However, with time, Israel began losing its supremacy in the region as its nuclear and missile arsenal is aging. The reason for this change has been the increasing proliferation of missile technology in the Middle East, and it is common for nations in the Middle East to acquire missile technology.<sup>29</sup> Not only have the United States and European nations proved to be sources of technology and know-how, but so have North Korea, Russia, and China. At the same time, the lack of control over the supply of these missiles from sources outside the region has contributed to their spread. North Korea, China, and Russia have gone against agreements and treaties concerning this technology in many

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<sup>26</sup> Heim, *Missiles for Asia?*, 10.

<sup>27</sup> Samaan and Lasconjarias, "The Israeli Experience," 5.

<sup>28</sup> Kattan, *GCC Missile Defense*, 8.

<sup>29</sup> Heim, *Missiles for Asia?*, 12–14.

instances. The rise in the number of missiles and their application in a conflict will continue the regional rivalries and to exacerbate the unresolved conflicts in the Middle East.

Apart from the proliferation of missiles in the Middle East, another threat to this region is missile technology transfer. Israel, Saudi Arabia, and Jordan are at risk for technology transfer programs, including the scientific and technical community that enables them.<sup>30</sup> Israel has been successful in transforming critical technologies via a number of joint development programs, and this has resulted in a considerable proliferation of advanced technologies.<sup>31</sup> Consequently, the knowledge of missile technology has spread from Israel to other nations.

The threat of sea-launched ballistic missiles is yet another issue Middle East countries, Israel, Saudi Arabia, and Jordan in particular, fear, and it has become more acute in recent years. While this concern was initially limited to few countries, the concern is spreading as more nations, such as India and Pakistan, consider acquiring sea-based missile technology.<sup>32</sup>

The common threats that Israel, Saudi Arabia, and Jordan face regarding the ballistic missiles that this threat equally emanates from external sources. Turkey stands out in this regard. In addition, these two nations pose a considerable threat due to their advanced missile and space programs. These programs have resounded in many parts of the Middle East. More so, Turkey has become a significant threat as of the acquisition of defense systems from both the United States and Russia to guard itself from attacks by Middle East neighbors. It is clear that the increase of ballistic missiles in the Middle East has been instrumental in leading to numerous challenges to Israel, Saudi Arabia, and Jordan face, hence presenting an opportunity for the development of an integrated BMD system.

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<sup>30</sup> Heim, 8–9.

<sup>31</sup> Heim, 6.

<sup>32</sup> Kattan, *GCC Missile Defense*, 10.



### C. RATIONALE AND SIGNIFICANCE OF THE STUDY

The purpose of this research study is to scrutinize the TBM systems belonging to the Middle East nations of Israel, Saudi Arabia, and Jordan in an effort to aid establishment of a comprehensive and integrated TBMD system to counter potential attacks. The rationale behind this study is the need to identify strategies that can be applied to facilitate the development of an all-inclusive and joined TBMD system for the Middle East. It is crucial for local nations and more specifically for the U.S. allies in the region. This is because missile attacks against countries, including Saudi Arabia, Jordan, and Israel, are forthcoming.<sup>33</sup> Because their enemies are exploring every vulnerability, including the instability in Yemen and Syria, to advance their attacks, these three countries face the biggest threats of missile attacks of all the Middle East countries.<sup>34</sup> Additionally, the possibility of attacks against these states by enemies of the United States is growing. Recently, the United States has paid limited attention to the conflict in the region, as witnessed during the Arab Spring. Moreover, this further rationalizes the need for this study, which is aimed at exploring the gap brought about by the limited U.S. participation in Middle East conflicts and the way in which countries in the region could develop a TBMD system with the view to reducing the dependence of allied states on the United States for the military assistance.

Accordingly, this study is significant for the U.S. policymakers as it contributes to the development of a lasting solution to the region's security threat emanating from the high proliferation of the missile technology. Additionally, it offers a strategy for saving funds that may be channeled into improving the security situation in other corners of the world.

Furthermore, the findings of this study are significant for such nations as Saudi Arabia and its Gulf Cooperation Council (GCC) partners (Oman, UAE, Bahrain, Qatar, and Kuwait) as it offers ways these nations can overcome their high reliance on the United

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<sup>33</sup> O'Rourke, *Sea-Based Ballistic Missile Defense*, 43.

<sup>34</sup> Kattan, *GCC Missile Defense*, 4.

States for protection.<sup>35</sup> Also, recommendations of the study provide insight for developing the best strategies to formulate an effective joined TBMD system so as not to have to rely on the import of the military equipment from the United States. Self-sufficiency is significant particularly since nations, such as Saudi Arabia, have yet to design a system for the manufacture of their own missile weapons.

In addition, this research study recognizes the common TBM threat, which such nations as Israel and Saudi Arabia face from a number of its neighboring enemies, including Iran and Syria. This research study investigates different platforms that may be used to promote cooperation between Israel, Saudi Arabia, and Jordan to develop a joint TBMD. This kind of cooperation would be useful since it would allow these three nations to put together their resources and technological know-how to create weaponry to enhance the security of the region.<sup>36</sup> Therefore, the study identifies the key aspects necessary for regional cooperation for the development of a TBMD system. It is essential to enhance the state of security in the region by ensuring countries have adequate defense from missile threats emanating from neighboring adversaries.<sup>37</sup> The findings of this study would be useful to smaller nations, such as UAE, Kuwait, Qatar, and Bahrain, any of which would benefit greatly from defense TBMD system should they join forces with Israel, Jordan, and Saudi Arabia in the creation of a TBMD system.

#### **D. PURPOSE OF THE STUDY**

The three countries that are under the highest threat for missile attack in the Middle East region are Israel, Saudi Arabia, and Jordan, and they have enjoyed close ties with the United States for many years. The key benefits that these countries receive from this close relationship include financial and military assistance. They also receive economic benefits because of much more favorable trade agreements with the United States. On the other hand, such nations as Syria and Iran, which are close neighbors of these states, have had a

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<sup>35</sup> Ochmanek et al., *U.S. Military Capabilities*, 56.

<sup>36</sup> Ochmanek et al., 59.

<sup>37</sup> Ochmanek et al., 39.

mostly antagonistic relationship with the United States.<sup>38</sup> Such an attitude has been openly expressed by all the ruling regimes of these countries for many years. In addition, these nations have been associated with such terrorist groups as IS and Al Qaeda, which pose a significant danger to the U.S. security. IS and Al Qaeda both have strong bases in Iraq and Syria, which further contributes to the divide between these nations and the United States.

Antagonism aside, the possibility of the attack by U.S. enemies such as Iran or Syria on it directly remains unlikely. The key reason for it is a rather sophisticated and largely impenetrable security system of the United States, which is one of the elements of its global power. Another reason is the long physical distance that separates the United States from the Middle East. Thus, the perfect way of harming the United States is attacking its allies in the Middle East,<sup>39</sup> and the short distance between these two factions allows launching short and medium-range TBMs easily in the attack against the U.S. allies.

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<sup>38</sup> O'Rourke, *Sea-Based Ballistic Missile Defense*, 45.

<sup>39</sup> Heim, *Missiles for Asia?*, 9.

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## **II. METHODOLOGY**

### **A. INTRODUCTION**

This chapter discusses the tools and systems used in this study. It also includes an analysis of all methodological approaches. The issues the chapter discusses include the research design of the study, methods for the selection of topics, and methods for data collection. The discussion of the research methodology allows the reader to gain insight into the logic of the development of the entire procedure, including key stages of this process, such as organizing, designing, planning, and carrying out the study.<sup>40</sup> The primary research methodology for this study was the secondary research methodology. In this method, the researcher collected data from secondary research sources on TBMD systems.

### **B. RESEARCH TYPE**

The secondary research design relies on the already available data collected and analyzed by other researchers. Secondary data comes in published and unpublished data.<sup>41</sup> The published secondary data, which can be quantitative or qualitative, include publications available on websites of the central and local governments, technical journals, foreign governments' publications, international bodies' publications, trade journals, books, and magazines. Published secondary sources also include reports and other publications that are provided by a wide range of organizations, including learning institutions, financial institutions, and industries. On the other hand, the sources of not published secondary data include biographies and autobiographies yet to be published, as well as letters and diaries. These sources might be possessed by private individuals and organizations.

In line with this research design, the researcher made use of the data collected by others. The data covered recent developments in TBMD and the overall proliferation of

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<sup>40</sup> Debra L. Worthington and Graham D. Bodie, *The Sourcebook of Listening Research: Methodology and Measures* (New York: John Wiley & Sons, 2017), 38.

<sup>41</sup> Hossein Tavakoli, *A Dictionary of Research Methodology and Statistics in Applied Linguistics* (Chicago: Rahnama Press, 2012), 12.

missiles in the Middle East, as well as the impact that these issues have had on U.S. allies in the region, specifically on Israel, Saudi Arabia, and Jordan. With this method, the researcher easily accessed data and information, especially with digital library access.<sup>42</sup>

### **C. RESEARCH APPROACH**

Positivist research philosophy was used in relation to the various quantitative secondary data sources.<sup>43</sup> This philosophy was useful in the investigation of the issue of TBMD from the perspective of the Middle East. The researcher also used cause-and-effect type of thinking for the holistic exploration of this issue using statistical data. The researcher analyzed these data to address the research questions. The quantitative of the data was significant in the identification of co-relations in the quantitative secondary data and helped to establish the relationship between the TBMD and development of appropriate knowledge in the case of the Middle East.

The qualitative nature of this study called for the use of a constructivist research philosophy. Through this philosophy, it was possible to collect data and use them to develop themes demonstrating the effect of TBMDs on Israel, Saudi Arabia, and Jordan, as well as a singular focus, TBMD.<sup>44</sup> The research philosophy also helped focus on the qualitative secondary data in the study. This approach was instrumental in the interpretation of the secondary data and critical for the accuracy of the qualitative secondary data and information with respect to the research questions.

Because the researcher used both qualitative and quantitative secondary data, the study required the use of both deductive and inductive research approaches. Therefore, for the quantitative component of this study, the researcher used deductive approach. In particular, the deductive approach starts on an already constructed hypothesis. Therefore, in this study, the hypothesis asserts that the TBMD results in the development of knowledge. The approach applied in this study indicates there is an idea that the TBMD

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<sup>42</sup> Worthington and Bodie, *The Sourcebook*, 47.

<sup>43</sup> Tavakoli, *A Dictionary of Research*, 26.

<sup>44</sup> Worthington and Bodie, *The Sourcebook*, 56.

results in the development of knowledge. Therefore, the researcher used this research approach with the aim of testing this theory.

This research study focuses on the issue of peace between Israel, Saudi Arabia, and Jordan as a consequence of these states coming together and developing a powerful TBMD system to provide all three countries with protection from their enemies in the Arab world. The research procedure identifies significant issues in this research area. The research questions for this study are:

- What is the role of the U.S. in the development and implementation of a TBMD system in the Middle East?
- What are the possible avenues that can be used to facilitate the development of a comprehensive and integrated TBMD system in the Middle East?
- What are the current challenges facing Israel, Saudi Arabia, and Jordan that thwart the development of a joint comprehensive and integrated TBMD system? How can these challenges be mitigated?
- What are the key ways Israel, Saudi Arabia, and Jordan can cooperate and work together towards the development of a joint comprehensive and integrated TBMD system?

This study uses descriptive research design to address questions concerning aspects of who, what, how, and why a development of a TBMD system could be used to cater to the security of Israel, Saudi Arabia, and Jordan. A descriptive research design is appropriate for the use in a secondary study since it fits neatly into neither the qualitative nor quantitative methods.<sup>45</sup> It is specifically due to this that this research design is able to use the benefits offered by these two methods, which allows for the use of all the available and most convenient secondary methods of data collection.

#### **D. SAMPLING TECHNIQUE**

Selecting a research sample is an essential stage of any study as the samples determine the findings. Based on the data collected from the sample, this study was able to draw useful conclusions. In addition, the cost-effective nature of sampling, elimination of

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<sup>45</sup> Tavakoli, *A Dictionary of Research*, 32.

time wastage, and the overall greater accuracy of results were some of the key reasons for sampling.<sup>46</sup> The researcher used random sampling technique for sampling a wide range of sources from secondary sources of information.

## **E. DATA COLLECTION**

In collecting secondary data, one of the key issues to consider is the availability and accessibility of information. For this study there was indeed enough data available concerning TBMD, missile proliferation in the Arab world, peace threats to Israel, Saudi Arabia, and Jordan, the role of the United States in these countries' TBMD efforts, and peace in this region. Furthermore, another crucial issue that the researcher considered was relevance of the data;<sup>47</sup> the relevant data also had to be accurate. The collection of this data required the researcher to identify of the key sources providing the most relevant data on the research topic. The researcher used the following keywords: TBMD, missile, the Gulf region, the Middle East, arms race, security, Israel, Saudi Arabia, and Jordan.

In the course of secondary data collection, the researcher took adequate time to understand and prepare this collection. To begin with, the researcher ensured that he familiarized himself with the original data. Moreover, the researcher identified the type of sources to which that the secondary data could be applied. The researcher cross-examined the information in the collection of the secondary data to devise the most appropriate constructs for the study.

In addition, the researcher considered various aspects of the secondary data prior to its collection. Another aspect this researcher considered was the suitability of the data and the definition of terms in the primary study to be used as secondary data. The researcher also considered the objectives and the scope of this study. The type of collection had to be in line with the research method and design employed in the primary study. If the primary information met the mentioned criteria, it was considered suitable for this secondary study.

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<sup>46</sup> Worthington and Bodie, *The Sourcebook*, 62.

<sup>47</sup> Lim and Ting, *Research Methodology*, 59.



The final aspect the researcher considered was the adequacy of the data.<sup>48</sup> The adequacy of the study implies that the objectives of the primary study had to be similar to those of this secondary study.

## **F. DATA ANALYSIS**

Data analysis was a significant aspect of the research methodology for this study. The collected data in their raw state were not useful to a meaningful decision-making process; therefore, analysis of the data was essential to their proper structuring and interpretation.<sup>49</sup> Thus, the researcher used thematic and documentary analysis on the data to accurately address the research questions. The thematic method of the data analysis entails the identification, assessment, and determination of potential patterns in datasets.<sup>50</sup> In this study, the researcher undertook the thematic analysis in a number of key phases. The first phase entailed the researcher becoming familiar the collected information through reading and re-reading the data.<sup>51</sup> In the second phase, the researcher generated initial codes that determined particular areas where patterns occurred and how they occurred. In the next phase, the researcher combined the codes into themes, which represented the collected data accurately. The method of the documentary data analysis involved the identification of the key themes from the data collected from various, which is essential to the finding meaning in the data as they related to the issue of developing a TBMD system that could be used to protect Israel, Saudi Arabia, and Jordan.

## **G. VALIDITY AND RELIABILITY**

The researcher considered validity and reliability essential to determine the level of objectivity of the research. Thus, validity and reliability can be understood as the key measurement tools useful in demonstrating the level of credibility and trustworthiness of a research study. In its respect, validity in research refers to the degree of accuracy and

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<sup>48</sup> Worthington and Bodie, *The Sourcebook*, 66.

<sup>49</sup> Lim and Ting, *Research Methodology*, 68.

<sup>50</sup> Worthington and Bodie, *The Sourcebook*, 69.

<sup>51</sup> Tavakoli, *A Dictionary of Research*, 44.

truthfulness of research findings. Furthermore, it is also defined as the methodological soundness or the degree of appropriateness of a measuring instrument used in the research.<sup>52</sup> Through it, a study can determine just how well a researcher collected or analyzed data; therefore, the researcher is able to capture the reality of issues under study holistically and adequately. In this secondary study, the researcher guaranteed the validity of secondary data through the use of some illustrative examples (Jordan, Saudi Arabia, and Jordan).<sup>53</sup> Furthermore, the fact that the researcher gathered most of the collected data from reliable sources enhanced the general validity of the study.

Concerning the reliability of the study, one should focus on the degree of consistency, reliability, and dependability of both data and findings.<sup>54</sup> Through reliability, the researcher reduced the number of errors in the course of the data analysis significantly. It is so because the reliability indicates the scores of an instrument used in research and determine whether they are stable and consistent or not. Reliability coefficients tend to range from 0 to 1. In such a manner, a high coefficient means a high level of reliability. In this case, the researcher determined the reliability of this study through the development of scoring results. These scoring results played a significant role in reducing the number of measurement errors.

## **H. ETHICAL REFLECTIONS**

It is significant to note that the study did not involve the collection of primary data. Therefore, human subjects were not directly involved in the research. However, the researcher faced the issue of ethical issue of consent in the course of collecting the secondary data. The researcher reviewed the terms and conditions of the sources and databases, from which the sources were derived, as well made payments to access some of these sources.<sup>55</sup>

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<sup>52</sup> Lim and Ting, *Research Methodology*, 33.

<sup>53</sup> Worthington and Bodie, *The Sourcebook*, 54.

<sup>54</sup> Lim and Ting, *Research Methodology*, 26.

<sup>55</sup> Worthington and Bodie, *The Sourcebook*, 70.

## **I.      LIMITATIONS**

The major limitation of this study is that secondary research design is associated with the limited quality of the secondary data and information the researcher collected. Determining the exact quality of these data was not possible because the researcher did not participate in the studies when they were conducted, and some of the studies the researcher found lacked validity and reliability. Moreover, this situation further limited the capacity of this study to determine the degree of quality of the data from these sources. However, the researcher addressed this issue by reviewing the process of data collection of these studies with close attention to the collection, analysis, and presentation of the findings.

## **J.      CHAPTER SUMMARY**

This chapter effectively has addressed all the research strategies and empirical methods of this study. It also has provided the discussion and rationale of all the specific techniques that allowed the researcher to address the research questions holistically. Accordingly, this research involved the use of the secondary methods of data collection. As a consequence, this had a bearing on the rest of the research methods the researcher chose for this study, including the research approach, philosophy, sampling methods, data collection method, and the data analysis method.

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### III. LITERATURE REVIEW

This literature review discusses the implications of the U.S. TBMD in the Middle East. Since the end of the of World War I and the fall of the Ottoman empire, the Middle East has drawn the attention of all superpowers due to its geography and availability of its resources. States within the Middle East possessing offensive military capability may escalate any potential conflict rapidly, which contributes to the region's instability. Since 1979 Iranian revolution, the relationship between the United States and Iran has been plagued with distrust, and this extends to U.S. allies too.<sup>56</sup> U.S. foreign policy toward this region is driven by various internal and external factors.

In his book *Clashes of Civilizations*, Samuel Huntington mentioned the zones of influence shared by the Soviet Union and the United States.<sup>57</sup> Additionally, he stressed what he saw as the inevitable cultural conflicts between the neighboring countries, nations, or ethnical minorities resulting from differences in culture, religion, and worldview. The theoretical framework created by Huntington was long accepted until the fall of Berlin Wall, when Francis Fukuyama famously announced the *end of history* and the expected expansion of democracy throughout the world as the most progressive and effective form of government.<sup>58</sup>

The three major international relations paradigms—realism, liberalism, and constructivism—offer different explanations and expectations for the U.S. involvement in dealing with TBM threats within the Middle East. Realists focus on national power, specifically military power, to protect and preserve national interests. For instance, realists argue that if Iran maintains its current regional influence and continues its military expansion, then a significant conflict or even war between the United States and Iran is

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<sup>56</sup> John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: W.W. Norton & Company, 2014), 360–411.

<sup>57</sup> Peter Holicza, “Convergence of Ideas? Analysing Fukuyama’s and Huntington’s Concepts of the Future,” in *Proceedings 16th International Scientific Conference Globalization and Its Socio-Economic Consequences*, Part II (Rajecke Teplice, Slovakia: University of Zilina, 2016), [https://ke.uniza.sk/sites/default/files/content\\_files/part\\_ii\\_final\\_1.pdf](https://ke.uniza.sk/sites/default/files/content_files/part_ii_final_1.pdf).

<sup>58</sup> Holicza, “Convergence of Ideas?,” 3–4.

unavoidable.<sup>59</sup> Realists, such as Mearsheimer, reason that there is no way that the United States can accurately predict Iran's intentions.<sup>60</sup> Additionally, Mearsheimer indicates that a nation's past behavior is a false indicator of its future behavior.<sup>61</sup> Therefore, he hypothesizes if both states are rational, both will react to this mutual uncertainty by assuming the other's worst intention and will attempt to maximize power, which leads to security competition.<sup>62</sup>

The second international relations paradigm, liberal theory, holds that nations possessing ballistic missile capability will cooperate with international regimes and to be integrated into the international rules and norms by predominantly having an interdependent economy, which will reduce the chances of an arms engagement.<sup>63</sup> In the era of globalization organizations such as the United Nations, World Trade Organization, and the International Monetary Fund will minimize military conflict,<sup>64</sup> and cooperation between regimes will reduce security competition. Furthermore, the emergence of the middle-class population through free market principle will marketize local economy and pose no threat to the world peace.<sup>65</sup>

Finally, the constructivists (proponents of the third international relations paradigm) argue that shared ideas, identity, and adoption of international norms will determine whether countries view each other as a threat.<sup>66</sup> Accordingly, the idea of redefining national security interests from a purely military perspective to a political-military comprehensive approach will solidify a regime's membership of the international

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<sup>59</sup> Mearsheimer, *The Tragedy*, 360–411.

<sup>60</sup> Mearsheimer, 360–411.

<sup>61</sup> Mearsheimer, 360–411.

<sup>62</sup> Mearsheimer, 360–411.

<sup>63</sup> Robert Keohane, *After Hegemony: Cooperation and Discord in the World Political, Economy* (Princeton, NJ: Princeton University Press, 1984), 49–64.

<sup>64</sup> Keohane, *After Hegemony*, 85–109.

<sup>65</sup> Richard Rosecrance, "The Worlds of International Relations," in *The Rise of the Trading State: Commerce and Conquest in the Modern World* (New York: Basic Books, 1986), 22–43; Stephen G. Brooks, "The Globalization of Production and the Changing Benefits of Conquest," *Journal of Conflict Resolution* 43, no. 5 (October 1999): 646–670.

<sup>66</sup> Alexander Wendt, "Anarchy is What States Make of It," *International Organization* 46, no. 2 (Spring 1992): 391–425.

community.<sup>67</sup> Additionally, the constructivists theorize that redefining a threat's identity culture from a confrontational to a cooperative one will result in cooperation within a given region. Thus, this identity shift reduces the possibility of arms conflict. Furthermore, adoption of international norms will eventually rely on its identity as a responsible member of international community.

The U.S. Missile Defense Agency acknowledged in a 2016 report that the proliferation of TBMs has been a growing problem in the 21st century as the cheap and widely available technology has enabled many small countries to possess TBMs. The authors of the report further note that the United States faces direct threats, especially on overseas bases, and this problem may well escalate in the future.<sup>68</sup> The primary role of the Missile Defence Agency is to provide a space-based TBM warnings to U.S. troops in the field around the globe so that U.S. troops can defend themselves from all possible missile attacks. Similarly, Middle Eastern countries should develop an advanced TBMD system and make it a priority in the future whereby the defense system would go further than intercepting the enemies' TBMs to organizing advanced evacuations of civilians in vulnerable areas.<sup>69</sup> Therefore, a compelling TBMD system would capable of performing a set of space-based as well as ground-based missions.

U.S. Missile Defense Agency website notes that the U.S. Theater Event System, as part of its TBMD system, is made up of Space-Based Infrared System, Tactical Detection and Reporting System, Defense Support Program satellite constellation, and joint tactical ground stations.<sup>70</sup> Hence, all the information gathered from these TBMD stations are continuously disseminated worldwide through the Integrated Broadcast Service.<sup>71</sup> The effective functioning of the Theater Event System requires that the Defense Support

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<sup>67</sup> Martha Finnemore, "Defining State Interests," in *National Interests in International Society* (Ithaca, NY: Cornell University Press, 1996), 1–33.

<sup>68</sup> U.S. Missile Defense Agency, "Theater Ballistic Missile Warning," October 19, 2016, <http://www.stratcom.mil/Media/Factsheets/Factsheet-View/Article/978912/theater-ballistic-missile-warning>.

<sup>69</sup> U.S. Missile Defense Agency, "Theater Ballistic Missile Warning."

<sup>70</sup> U.S. Missile Defense Agency.

<sup>71</sup> U.S. Missile Defense Agency.

Program satellites detect heat from missile booster plumes or the missile against the more stationary background of the earth's surface. The U.S. Missile Defense Agency also notes the successful use of the Defense Support Program from the early 1970s, as it is capable of detecting TBMs during their early stages of launching.<sup>72</sup> During Operation Desert Storm, the Defense Support Program's software received an upgrade to reprogram it to be able to detect the Scuds (short-range TBMs launched by the Iraqis at the coalition forces).

The Space Based Infrared System is a follow-up to the Defense Support Program operated from the ground to bolster the surveillance and detection of the TBMs. The Mission Control Station at Buckley Air Force Base in Aurora, Colorado, and the Air Force Space Based Infrared Systems represent the U.S. commitment over the years to strengthen its TBMD system.<sup>73</sup> The United States extensively used the Space Based Infrared System used during the Iraqi missions in 1991 and 2001 as it provides early warning to the U.S. troops on the ground.<sup>74</sup> By contrast, the joint tactical ground stations are mobile; hence, they can be moved to the battleground to boost the surveillance and defense against TBMs. By using the joint tactical ground stations, the theater commanders are capable of obtaining data and dispatching information about the launching of a TBM.

In addition, the joint tactical ground stations can process multiple data received from the Defense Support Program. Hence, the program can accurately detect the position of the TBMs as well as the targeting position and cueing requirements in a bid to increase the security of a theater.<sup>75</sup> Correspondingly, the Tactical Detection and Reporting System has the capability to perform space surveillance and provide timely warning to different theaters on the ground. Additionally, the Tactical Detection and Reporting System has sensors that work together to provide timely warning and intelligence to the joint troops conducting simultaneous missions on land, sea, and in the air.

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<sup>72</sup> U.S. Missile Defense Agency.

<sup>73</sup> U.S. Missile Defense Agency.

<sup>74</sup> U.S. Missile Defense Agency.

<sup>75</sup> U.S. Missile Defense Agency.



Though the U.S. is positioned to detect TBM threats, most Middle Eastern countries do not have such sophisticated technology. Moreover, as Gormley posits, the Middle East is facing increased threats from TBMs, which have recently been used by Houthis to play a destabilizing role in the region especially among the countries that have a strong affiliation with Western powers.<sup>76</sup> Gormley also explains that some Middle Eastern nations are making individual efforts to bolster their defenses against the TBM attacks.<sup>77</sup> For instance Israel, as the country in the Middle East facing the most serious threats from TBM attacks, has moved to assemble one of the most massive missile arsenals in the region capable of countering multiple TBM attacks.

It should also be noted that Israel recently unveiled three new missile defense systems indicating its resolve to increase its defense against possible TBM attacks. The Arrow-3 missile defense interceptor is one of the defense arsenals set up by Israel that has the capability to intercept TBMs out of the earth's atmosphere.<sup>78</sup> Also, Israel has set up the Iron Dome, which is a TBMD system with the sole mission of intercepting and short-range TBMs as well as artillery shells at a very close range of approximately four to 70 km.<sup>79</sup> In addition, the country unveiled David's Sling, which is designed to intercept TBMs, aircraft, drones, tactical ballistic missiles, and cruise missiles as well as medium- to long-range rockets.<sup>80</sup> Similarly, David's Sling can fire and counter TBMs at distances of 40 km to 300 km. Additionally, Israel's nuclear-armed arsenal, known as Jericho-3 ballistic missiles, perform the role of deterring enemies' TBMs and other long-range missiles at a range of between 4,800 km to 6,500 km.<sup>81</sup> Similarly, the country's defense department has also emplaced a Popeye-series of land-attack cruise missiles to provide precise strikes against enemies' airfield and bunkers.

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<sup>76</sup> Dennis M. Gormley, "The Destabilizing Role of Missiles in the Middle East," Middle East Institute, May 25, 2017, <http://www.mei.edu/content/article/destabilizing-role-missiles-middle-east>.

<sup>77</sup> Gormley, "The Destabilizing Role."

<sup>78</sup> Eric Auner, "Israel Tests New Ballistic Missile Target," *Arms Control Today* 43, no. 8 (2013): 25.

<sup>79</sup> Gormley, "The Destabilizing Role."

<sup>80</sup> Gormley.

<sup>81</sup> Gormley.

Saudi Arabia, which also possesses a stable economy, also faces significant TBM threats because the Arab giant enjoys close ties with Western powers. According to Misher, Saudi Arabia hosts one of the largest foreign army bases of the United States as well as facilitates for several NATO operations in the region.<sup>82</sup> However, despite the numerous TBM threats that Saudi Arabia is facing, the country only possesses a small collection of BMD systems, which it acquired as a result of its bilateral and defense deal with China. Moreover, the BDMs that Saudi Arabia has are only capable of performing in a limited role, primarily delivering conventional warheads. In 1987, Saudi Arabia acquired DF-3 missiles, and Misher observes that despite the massive inaccuracies associated with the missile, it is capable of launching to a range of 2,500 km.<sup>83</sup> The Chinese also sold the DF-21 missile to the Saudis in 2007, and it has a range of 1,700 km and uses stable fuel, which makes it more useful and ready to launch than the DF-3.

Meanwhile, the Saudi government's lack of a comprehensive and an up-to-date TBMD means that it relies on the U.S. TBMD system. The country has been a U.S. ally for decades, and it has several treaties and defense deals with the United States to ensure the latter provides it with a comprehensive TBMD system. Saudi Arabia also depends on the TBMD system offered by the French and British defense departments to bolster both its land and sea defense.<sup>84</sup> Moreover, the Storm Shadow is a land attack cruise missile jointly provided to Saudi Arabia by Britain and France and can counter TBMs up to 3,000 km range.

Prominent missile threats to Saudi Arabia are from Iran and Syria, which also pose a wider threat to the region. Gormley identifies Syria and Iran as countries posing a threat and contributing to the Middle East instability through their continued development and acquisitions of TBMs—with assistance mainly from Russia, North Korea, and China.<sup>85</sup> It

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<sup>82</sup> Kimberly Misher, *Why Obama is Right on Missile Defense—What's Next?* (Pittsburg, PA: Carnegie Endowment for International Peace, 2009), [https://carnegieendowment.org/files/misher\\_missile\\_defense.pdf](https://carnegieendowment.org/files/misher_missile_defense.pdf).

<sup>83</sup> Misher, *Why Obama is Right*.

<sup>84</sup> Gormley, "The Destabilizing Role."

<sup>85</sup> Gormley.

is widely believed that Syria has taken full advantage of its ongoing internal war and its relationship with Russia to add on to its missile holdings. Some of the TBMs that the nation has procured from China, North Korea, and Russia include Scud-C missiles, which that have a range of 550 km; Scud-B missiles, which that have a range of 300 km; and Scud-D, missiles, which have a variety of 700 km. Moreover, Syria has also acquired S-300 and S-400 as Russian TBMDs.<sup>86</sup> Already, Israel has used its sophisticated defense missile when it used its Arrow-3 missile defense system to intercept and destroy a TBM Syria had launched at it.

Iran's TBM inventory includes the Shahab-3, which has a range of 1,000 km, and this makes it capable of reaching Israel, Saudi Arabia, Jordan, and other GCC countries within the same range<sup>87</sup> Iran also possesses various long-range missiles, like the Ghadr-1; however, it has recently halted the development of long-range TBMs and concentrating in lieu on short and medium-range missiles, which underlines its resolve to destabilize the Middle East region.<sup>88</sup> Misher shares that Iran possesses four liquid-propellant and ballistic missile systems, which range between 300 km and 1,000 km; this highlights Iran's shift from producing long-range missiles to short and medium-range TBMs.<sup>89</sup> Misher further argues that Iran has long sought to undermine the GCC and establish its own control along the Persian Gulf.<sup>90</sup>

Furthermore, Iran and Syria are not the only entities whose actions in the Middle East are destabilizing. Gormley asserts the increased possessions of short- and medium-range TBMs by non-state actors, like Hezbollah and Hamas, which continuously aim to attack Israel also contribute to instability in the region.<sup>91</sup> Thus far, Israel has managed to

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<sup>86</sup> Gormley.

<sup>87</sup> Gormley.

<sup>88</sup> Nasser Karimi and Jon Gambrell, "Iran's Supreme Leader Limits Range for Ballistic Missiles Produced Locally," *Defense News*, October 31 2017, <https://www.defensenews.com/global/mideast-africa/2017/10/31/irans-supreme-leader-limits-range-for-ballistic-missiles-produced-locally/>.

<sup>89</sup> Misher, *Why Obama is Right*.

<sup>90</sup> Misher.

<sup>91</sup> Misher.

successfully counter such threats through its advanced TBMD system, which is capable of countering multiple TBM attacks from different directions.

In a 2015 article, Harper discusses the imminent TBM attacks that the Middle East faces as well as the efforts by some countries, particularly those around the Persia Gulf, which are committed to establishing an integrated missile defense system in the region.<sup>92</sup> Also in a 2015 article, Cook shares the same view as he discusses the increasing threat the U.S. allies along the Persian Gulf face in Iran's massive acquisitions and deployment of TBMs from countries like China and Russia.<sup>93</sup> Harper underscores the efforts put forth by the GCC to establish an integrated BMD to cover threats of TBMs, among others.<sup>94</sup> Tehran—which is at a very close range to the Gulf nations—has for decades wanted to control the region both economically and militarily thus targets at the GCC nations that are close American allies.

Unlike Israel, the GCC nations face one common enemy in Iran. Thus, all their TBMD mechanisms are solely developed to counter any potential threat from Iran. Furthermore, as Harper posits, due to the proximity of Saudi Arabia to Tehran, the country alongside its GCC partners face challenges in detecting and intercepting short- and medium-range TBMs, which can take less than 10 seconds to be launched and hit a marked target in the region.<sup>95</sup> Therefore, with the help from America, Saudi Arabia has been leading the negotiations among the GCC members to identify ways through which the Persian Gulf's missile defense could be upgraded.

However, the plans to boost the TBMD along the Persian Gulf face immense challenges from within as the GCC members are unwilling to rely on each other's security systems. Additionally, the region receives significant defense support from the United

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<sup>92</sup> Jon Harper, "Analyst: Middle East Countries Moving toward Integrated Missile Defense System," *National Defense Magazine*, May 5, 2015, <http://www.nationaldefensemagazine.org/articles/2015/5/5/analyst-middle-east-countries-moving-toward-integrated-missile-defense-system>.

<sup>93</sup> Damen J. Cook, "U.S. and UK Theater Missile Defense: Options and Challenges," Phoenix Think Tank, December 8, 2015, <https://www.phoenixthinktank.org/articles/damen-j-cook-us-and-uk-theater-missile-defense-options-and-challenges.html>.

<sup>94</sup> Harper, "Analyst: Middle East Countries."

<sup>95</sup> Harper.

States, which is far more advanced and rapid than what they want to establish.<sup>96</sup> In 2017, cracks emerged in the GCC as Qatar, which is both a strategic member of the council as well a close ally of United States, became entangled in a dispute with the rest of the GCC members. The dispute led to Qatar, which neighbors Iran, to be sidelined from the council.<sup>97</sup> In 2017, other GCC members accused Qatar of collaborating with Iran and terrorist organizations, accusations that Qatar has denied.<sup>98</sup>

Therefore, the hopes of establishing a TBMD in the region appears to have hit a snag as Qatar in 2018 entered into negotiations with Russia to develop and acquire advanced BMD system for itself.<sup>99</sup> The United States has also sold THAAD to Qatar thus making it confident of intercepting any TBM attack in the region. Rather than waiting on a theater system, as Skinner notes, the UAE has moved to acquire a Terminal High Altitude Area Defense (THAAD) system from the United States in a bid to boost its ground, air, and sea defenses.<sup>100</sup> As Harper explains, the result has been that Saudi Arabia, which holds the largest stake in the region, stands to become the biggest loser as the other GCC members continue to pursue their individual TBMD systems to boost their respective defenses.<sup>101</sup> Saudi Arabia and Iran have been involved in a prolonged tussle to gain control of the region hence, it remains the primary target to be hit by Tehran's TBMs so a TBMD system would be very useful to it. Hedging its bets, Saudi Arabia has moved at great speed to also acquire Russian TBMD systems in a bid to strengthen its own defense systems.

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<sup>96</sup> Harper.

<sup>97</sup> Reuters and Haaretz, "Buy Advanced S-400 Air Defense Missiles," Haaretz, January 25, 2018, <https://www.haaretz.com/middle-east-news/qatar-in-talks-with-russia-to-buy-s-400-air-defense-missiles-1.5765685>.

<sup>98</sup> "Rohani, Rejecting Saudi-Led Blockade, Says Iran Seeks to Bolster Ties with Qatar," *Radio Free Europe Radio Liberty*, June 27, 2017, <https://www.rferl.org/a/rohani-rejecting-saudi-led-blockade-says-iran-seeks-bolster-ties-qatar/28580846.html>.

<sup>99</sup> *Radio Free Europe Radio Liberty*, "Rohani."

<sup>100</sup> Kiron K. Skinner, "Missile Defense: Past, Present, and Future," *Strategika*, no. 27, October 30, 2015, <https://www.hoover.org/research/missile-defense-past-present-and-future>.

<sup>101</sup> Harper, "Analyst: Middle East Countries."

Cook notes that China and Russia have displayed a recent upsurge interest in the Middle East as they try to weaken the U.S. influence in the region.<sup>102</sup> As such, China and Russia have been busy selling their TBMD apparatuses to Saudi Arabia, Jordan, and other GCC members. Similarly, the two U.S. rivals are also selling the TBMs to countries like Iran and Syria as well as non-state organizations like Hamas, Hezbollah, and Hothi, which threaten the commitment of the United States in the Middle East.<sup>103</sup> Besides, with the rivalry among the United States, China, and Russia intensifying by the day, Middle Eastern countries like Saudi Arabia, Israel, and Jordan stand to be turned into a battle zone between rivals would want to flex their defensive muscles.<sup>104</sup> Cook further observes the economic opportunities that the Middle East offers and how various world powers are trying feverishly to a share of the region's wealth; hence, they use effective TBMD systems as bait to gain some stakes in Middle Eastern countries' resources.

Kasapoglu and Vehbi emphasize that it is a challenge for any country to conceptualize the TBMD within the structure of war and strategy theory.<sup>105</sup> The authors identify the higher probabilities of a country influencing the occurrence of war or conducting war as a result of setting up TBMD systems. They also provide an alternative view on countries establishing TBMD. The authors claim TBMDs are strategic tools for mitigating strategic vulnerabilities as opposed to being tools to ignite wars.<sup>106</sup> The creation and implementation of a comprehensive TBM system requires setting up military standpoints to facilitate multilayered interceptions of launched missiles. Medium, as well as long-range TBMs, require a TBMD system that is capable of performing exoatmospheric interceptions of the TBMs warheads. Accordingly, it is critical for the TBM systems to be capable of performing these functions to avoid the risk of that would threaten to sabotage the missile defense mission of a given country.

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<sup>102</sup> Cook, "U.S. and UK Theater Missile Defense."

<sup>103</sup> Cook.

<sup>104</sup> Skinner, "Missile Defense."

<sup>105</sup> Can Kasapoglu and Asim Vehbi, *Strategic Defensive Weapons and Evolution of Intrawar Deterrence: Assessing Missile Defense Trends in the Middle East* (Cyprus: American University, 2015).

<sup>106</sup> Kasapoglu and Vehbi, *Strategic Defensive Weapons*.

The U.S. Strategic Command holds similar views as Kasapoglu and Vehbi as in a 2016 factsheet, it also underlines the challenging tasks involved in developing, installing, and operating TBMD systems. Furthermore, the TBM compact system is a sophisticated system of systems and networks that only a few select countries can rely upon. Additionally, the U.S. Strategic Command also highlights the financial and economic implications of countries investing in TBMD systems as the investments are extremely capital intensive.<sup>107</sup> In the Middle East, Kasapoglu and Vehbi observe that the GCC is working on a framework that is based upon their multilateral bilateralism to establish the joint TBMD system.<sup>108</sup> However, the authors note the reluctance of some members of the organization to work with others due to trust issues. Kasapoglu and Vehbi observe that countries like Qatar, Bahrain, and Oman are willing to work together through their multilateral/bilateralism ties even though such relationships spell out that they also have to exclusively work with the United States to enhance their TBMD systems.<sup>109</sup> Furthermore, countries like Saudi Arabia, the UAE, and Qatar, which have procured American-made TBMD systems such as Patriot variants and THAAD, must still seek Washington's support to enhance their missile defense.

Additionally, in 2013 the GCC managed to form the Unified Military Command, a missile defense umbrella to cushion all members of the corporation against TBMs.<sup>110</sup> Nonetheless, the effectiveness of the Unified Military Command has been threatened as a result of lack of unity and constant disagreements among the GCC members. Cook points to a similar lack of unity and cooperation in the Middle East region as a primary reason why majority of the countries lack their independent advanced TBMD systems.<sup>111</sup> Therefore, countries like Israel, which could benefit from missile defense by forming and joining alliances in the region, resolve to operate independently—an extremely expensive

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<sup>107</sup> U.S. Strategic Command, "Theater Ballistic Missile Warning" last modified October 19, 2016, <http://www.stratcom.mil/Media/Factsheets/Factsheet-View/Article/978912/theater-ballistic-missile-warning/>

<sup>108</sup> Kasapoglu and Vehbi, *Strategic Defensive Weapons*.

<sup>109</sup> Kasapoglu and Vehbi.

<sup>110</sup> Kasapoglu and Vehbi.

<sup>111</sup> Cook, "U.S. and UK Theater Missile Defense."

move. Lack of trust among Middle Eastern countries works against them and exposes all of them the threats of TBM attacks. Kasapoglu and Vehbi argue that all the Middle Eastern countries facing TBM attacks trust the United States, thus forcing the world's superpower to a participant in defensive missions in the region for other members to join the operations.<sup>112</sup> Still, individual countries in the region are slowly taking initiatives to upgrade their TBMD systems, which are right steps toward ensuring the safety of the civilians in the region.

#### **A. CAPABILITIES ANALYSIS**

This part of literature review further explicates TBMD in Israel, Saudi Arabia, and Jordan. The first part focuses on TBMD in Israel and the role that the United States plays in the country's missile defense. The second part focuses on TBMD development in Saudi Arabia, including U.S. contributions to the development. The third part focuses on Jordan's TBMD development as well as strengths, weaknesses, opportunities, and threats (SWOT), which characterize TBMD in each country.

One should note that the Middle East is the world region most affected by the general proliferation of TBMs.<sup>113</sup> The use of ballistic missiles for threatening activities has been an ongoing issue since the end of World War II. Over 90 percent of these missiles launched in the world target a location in the Middle East.<sup>114</sup> The increasing number of missile attacks and threats has necessitated the adoption of effective missile defense systems by Middle Eastern countries.<sup>115</sup> An example of a significant role of the United States in relation to TBMD is its provision of missile warnings aimed at preventing any undesired attacks against its armed forces and allies in the Middle East. Israel has the largest missile defense arsenal in the Middle East, and it does depend fully on the United States for the required TBMD. On the other hand, Saudi Arabia has a small arsenal of missiles that it has acquired from China. Even so, the United States remains a significant

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<sup>112</sup> Kasapoglu and Vehbi, *Strategic Defensive Weapons*.

<sup>113</sup> O'Rourke, *Sea-Based Ballistic Missile Defense*, 34–35.

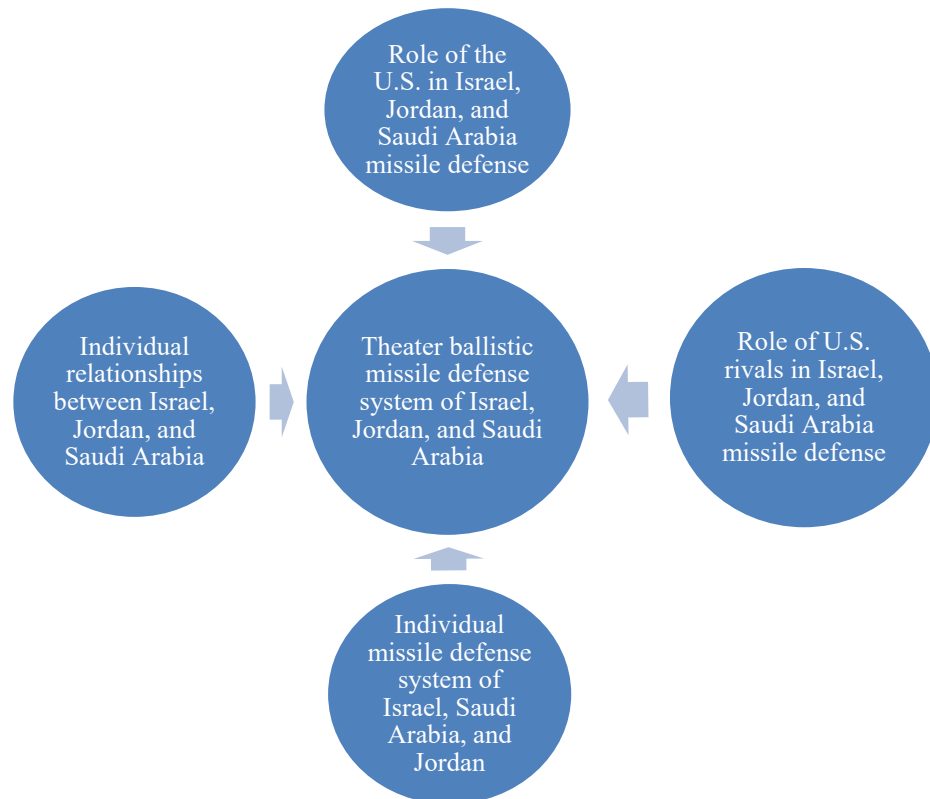
<sup>114</sup> Ochmanek et al., *U.S. Military Capabilities*.

<sup>115</sup> Kattan, *GCC Missile Defense*, 5.



power concerning TBM technology and weapons in Saudi Arabia. The United States has focused on the promotion of stability, as well as the provision of early warnings of any missile attacks, in each of the countries (see Figure 1).

Figure 1. Conceptual Model



## B. TBMs GLOBALLY

The adoption of TBMD has continued gaining popularity, as over 31 countries have systems in place. Accordingly, countries such as China, Russia, Iran, Syria, and North Korea, are in the course of adopting TBMs for self-protection so as not to be left behind. On the list of the countries with TBMs, China and Russia have the strongest defense

systems,<sup>116</sup> mainly to protect themselves against the United States and other potential enemies.

### **C. TBMD IN ISRAEL**

Israel has made a fierce effort in its protection against missile attacks. According to Samaan and Lasonjarias, Israel launched its first TBM, dubbed the Arrow, in 1988, and it released an advanced version emerged in 2000 (Arrow II).<sup>117</sup> The benefits of the Arrow with relation to its high cost has raised concerns among experts as to whether the project is worth it. To make the Arrow II more efficient, developers have subjected it to a variety of tests, the most significant of which was in 2004.<sup>118</sup> The United States is a significant financier and technical advisor of the TBMD program in Israel because of U.S. strategic interests in the region. The TBMD has two batteries, one near Tel Aviv and another one in the south of Haifa. The placement of these batteries is to boost the efficiency of defense over a large area. In general terms, Israel continues to advance its TBMD; in tests, the Arrow II has made 14 intercepts, while the original Arrow system made nine intercepts.

#### **1. The Role of the United States in Israel TBMD**

The United States plays a significant role in the TBMD of Israel in a couple of ways. First, United States has been the core co-financer of Israel's Arrow anti-BMD system to boost Israel's security and ensure that it could defend itself against the glaring threats from its neighbors in the Middle East. The co-financing has also allowed the United States to be directly associated with the TBMD in Israel; the TBMD is a significant warning to potential enemies of Israel that it has a strong defense mechanism. In 2007, the U.S. Congress allowed the U.S. Missile Defense Agency to extend American funding of the Arrow System Improvement Program. Additional funding enhanced the development of Arrow III. To date, estimates show Israel has spent over \$2.8 billion were spent on the

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<sup>116</sup> Peter Roberts, *UK Ballistic-Missile Defense: Drivers and Options* (London: Royal United Services Institute for Defence and Security Studies, 2015), [https://rusi.org/sites/default/files/201508\\_op\\_ballistic\\_missile\\_defence.pdf](https://rusi.org/sites/default/files/201508_op_ballistic_missile_defence.pdf), 4.

<sup>117</sup> Samaan and Lasconjarias, "The Israeli Experience," 3.

<sup>118</sup> O'Rourke, *Sea-Based Ballistic Missile Defense*, 50–53.

development of the TBMD in Israel; the United States funded over 60 percent of the costs.<sup>119</sup> It is vital to observe that the co-financing by the United States has allowed Israel to develop a strong missile defense system. The threat of attack from countries with advanced programs (such as Iran) has necessitated extensive research.<sup>120</sup>

Second, the United States plays a significant role in the demonstration and testing of Israel's TBMD system. The United States was directly involved in the first demonstration phase in 1988 when the U.S. Department of Defense Initiative presented Arrow I,<sup>121</sup> which weighed about 2,000 kilograms. First tested in 1995, Arrow II had a smaller weight of 1,300 kilograms.<sup>122</sup> Further tests were run on Arrow II when successfully completing 14 intercepts. The testing has been vital in leading to the population trust in the effectiveness of the TBMD for the protection of the country.

Third, the United States has increased the level of research funding it provides to Israel and the subsequent participation in the development of Israeli missile defense systems. The biggest focus by the United States has been the mitigation of the long-range weapons development in the Middle East. Based on the research, focus has been placed on the capabilities for defense against potential nonconventional missile attacks.

## **2. The Role of the U.S. Rivals in Israeli TBMD**

Both the United States and its allies, and specifically Europe, pursue the some of the same goals and missions in the Middle East, and both continue to face significant threats from competitors and adversaries, including Russia, Iran, China, and North Korea, which have been in the process of developing their nuclear arsenals. Other threats are from such terrorist groups as Hezbollah and the Hamas. As this suggests, European nations, for example the United Kingdom, have remained committed to the idea of providing Israel with support for the development of TBMD. These nations collaborate openly with Israel

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<sup>119</sup> Samaan and Lasconjarias, "The Israeli Experience," 4.

<sup>120</sup> Ochmanek et al., *U.S. Military Capabilities*, 76–79.

<sup>121</sup> Army Technology, "Arrow 2 Theatre Ballistic Missile;" Samaan and Lasconjarias, "The Israeli Experience," 5.

<sup>122</sup> Army Technology, 5.

by helping it develop effective defense against missile attacks. Europe has the Aegis that offers the needed cover to both European and Middle Eastern countries, including Israel, against attacks from Iranian ballistic missiles and other enemies.<sup>123</sup> Therefore, European offer support to help protect Israel from attacks by its foes in the Middle East, such as Iran, which like others, have been in the race of developing first strike technologies for many years.

In the same vein, NATO is closely cooperating with Israeli forces to enhance the level of protection against such mutual enemies as Iran. For instance, NATO is pursuing the Active Layered Theater Ballistic Missile Defense Program, which aims to ensure that European countries are protected against missile attacks.<sup>124</sup> Israel is of particular interest to Europe because it allows Europe to gain special benefits from the program in terms of defense against missile attacks.

In general, the U.S. allies in the Middle East employ the strategy and tools United States has used for some years already. Overall, the countries prioritize the development of impeccable TBMD for Israel. The biggest threat that has been identified is Iran, and thus the focus has been made on ensuring that the adequate protection is offered to the country in the course of fighting against the potential attacks, especially from the already known enemies in the region.

### **3. The Role of Israeli TBMD**

The Israeli Missile Defense Organization has been at the forefront of boosting the development of the TBMD. Israel has been actively researching and developing missile programs with the goal of boosting the protection of the entire country against guerrillas, such as Hezbollah, and other enemies, such as Syria and Iran. The role of the Israeli BMD is to intercept hostile missiles (e.g., weapons of mass destruction), which that have the potential of destroying any part of Israel. The capability of the TBMD reaches 1,500 miles and nine times the speed of sound, and the Arrow III has been outstanding in terms of

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<sup>123</sup> Army Technology, 5.

<sup>124</sup> Ochmanek et al., *U.S. Military Capabilities*, 76.

boosting the rate of defense against hostile missiles from Israel's enemies. Additionally, the capacity to detect and track missiles as far as 300 miles and disable the incoming warhead by exploding in an estimated 40 to 50 yards of the target.<sup>125</sup> The ability to detect the different types of warheads makes it easier for the defense system to destroy all types of hostile missiles entering Israel's air space.<sup>126</sup> This strategy has gone a long way toward guaranteeing Israel the desired level of safety, and the support from the United States makes it better.

Israel's TBMD program has also significantly benefited from NATO since, in both cases, the decision makers have used missile defense as a convenient political tool.<sup>127</sup> For instance, the development of Iron Dome planted the political opinion that Israel needed a strong system of defense to stand against all forms of enemies entering its space. The TBMD has been a vital political tool for Israel and has been present in the agenda of most politicians. Because of a strong defense mechanism created by Arrow 3 and Iron Dome, the government has been able to convince the population it is doing everything it can to protect the population against any attacks. For instance, the success of the Iron Dome during the Operation Pillar of Defense in 2012, wherein the Israeli Defense Forces conducted a military operation in Gaza, allowed the government to justify the need for developing stronger defensive mechanisms that would make every citizen safe in the country.

#### **4. SWOT Analysis of the Israeli TBMD System**

SWOT is an analysis to define the external and internal factors that are either favorable or unfavorable in achieving a desired objective. The strength and weaknesses are usually internal, and the opportunities and threats are usually external factors.

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<sup>125</sup> Ochmanek et al., 70.

<sup>126</sup> Samaan and Lasconjarias, "The Israeli Experience," 6.

<sup>127</sup> Ochmanek et al., *U.S. Military Capabilities*, 88.

*a. Strengths*

One of the strengths of Israeli defense is its collaboration with the United States in creating a multilayered missile defense system, which when compared to other missile defense systems elsewhere, many considered to be the most advanced.<sup>128</sup> The advancement in technology is significant because it ensures that there is a strong defense system for the country in terms of its security. For instance, the Arrow III interceptor is a strong and multilayered system that has given Israel a major advantage and allowed boosting its own defense. The country has the system to defend itself against the current and future threats in the region, especially from such states as Iran.

More so, collaborating with the United States is an advantage because of the financial capabilities that it offers in regard to the improvement of the Arrow system and other projects of creating defense missiles.<sup>129</sup> The United States has played a vital role in boosting Israel's position by ensuring that it does not have to spend its own capital by providing the effective funding required for the country to attain its goal of building a strong and secure system. The largest funding has been allocated for the Arrow ballistic missiles; the United States has cooperated with Israel in this project to provide the necessary financial resources to build the most efficient TBMD system.

Israel possesses many intermediate- or short-range warheads. It also has a number of Patriot batteries and other sophisticated systems to react quickly to any missile threat. In addition, its low-level missile systems may counterattack the enemy's aircraft or any unmanned aerial vehicles.<sup>130</sup> As a result, Israel is in a stable position since it can defend itself from any major or minor missile attack in the region effectively. It is constantly improving its ability to tackle all types of missile attacks.

The TBMD capacities include the:

1. Arrow 2 and Arrow 3, which have three batteries each and are ground-based;

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<sup>128</sup> O'Rourke, *Sea-Based Ballistic Missile Defense*, 57–59.

<sup>129</sup> Samaan and Lasconjarias, "The Israeli Experience," 3.

<sup>130</sup> O'Rourke, *Sea-Based Ballistic Missile Defense*, 59–60.

2. David's Sling, which is currently in use and can be used on ground, naval, or aerial platforms;
3. Iron Dome, which has 10 batteries and is used on ground;
4. Patriot-2, which has three batteries, is mobile, and can be used from the ground; and
5. Green pine radar, which has two batteries and is transportable or can be used on ground.<sup>131</sup>

Israel has started the integration of naval ships into the Iron Dome system; the project aims to protect the Israeli ships and other assets at sea.<sup>132</sup> Israel has successfully tested this system in simulated projectiles that mimicked external threats in that region. Therefore, apart from the protection on land, Israel has benefitted in terms of achieving the protection on the sea.

The inclusion of the multilayered aerial shield into David's Sling, the Iron Dome, and the Raytheon's Centurion Super machine gun means that Israel's active missile defense program has reached success. As such, Israel is the first country in the Middle East able to protect itself against threats of any range; this ability definitely provides Israel with a strategic position in the region.<sup>133</sup> Diverse systems ensure that the country does not experience any threat or fear of threats. Consequently, the government could easily assure all citizens of the high level of protection against attacks.

#### ***b. Weaknesses***

One of the weaknesses that Israel faces is that it is a very small country. Therefore, the presence of any ballistic missiles in the Middle East represents a great threat to the country; hence, it has to develop ways of protecting itself (e.g., with the anti-defense missile). The small size of the country tends to be a disadvantage since an attack on it can be launched easily and within a short time.

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<sup>131</sup> "Why Saudi Arabia and Israel Oppose Iran Nuclear Deal," *Al Jazeera*, April 14, 2015, <https://www.aljazeera.com/news/2015/04/saudi-arabia-israel-oppose-iran-nuclear-deal-150401061906177.html>.

<sup>132</sup> Samaan and Lasconjarias, "The Israeli Experience," 3.

<sup>133</sup> Ochmanek et al., *U.S. Military Capabilities*, 15.

Another weakness is that, despite the fact that Israel owns these kinds of defense systems, it can face some problems frequency interference connected with the technology and thus the use of multiple defense systems. This fact may deter the development and use of the lower level missiles defense systems.<sup>134</sup> In addition, this issue may bring disagreement civilian and military sectors concerning the allocation of funds for different goals and reasons.

*c. Opportunities*

Allied with Jordan and Egypt, Israel can use that opportunity and locate stage some of its BDM systems in these countries to increase its own security coverage and thus protect itself from enemies. For example, Israel can use the Jordan Valley to defend against its enemies easily even with short-range and medium-range defense missiles. Increasing the area of the TBMD operations provides alternatives in most missile interception tests while also ensuring that a larger area is covered for its ultimate protection.<sup>135</sup>

The United States funds Israeli research and development of the BDM system, and it is an opportunity for the country to improve not only its economic advantage in the region but also its. The United States has continuously focused on offering the necessary support to Israel against enemy threats by supporting it in the development of TBMD. Of course, this assistance is based on the U.S. interests in the Middle East.<sup>136</sup> Even so, Israel can take advantage of the increasing research and development means to boost its security against missile attacks, and thus fully protect its citizens from all types of missile attacks.

The war and conflicts inhibit the economic development of Israel as well as its relationship with Jordan, which, as it is stable, can assist in peace talks, help soften the conflict between countries in that region, and create a better environment for the growth. Israel can reach out to other countries and see if they could design an amicable solution to the current security problems and reduce armaments in the region.<sup>137</sup>

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<sup>134</sup> *Al Jazeera*, "Why Saudi Arabia."

<sup>135</sup> Samaan and Lasconjarias, "The Israeli Experience," 4.

<sup>136</sup> *Al Jazeera*, "Why Saudi Arabia."

<sup>137</sup> *Al Jazeera*.



Israel needs low-level defense systems in populated areas since the Iron Dome, a high-level defense system, has been created to protect only the strategic areas. The low-level defense systems give the government of Israel the chance to demonstrate its commitment to the protection of all its citizens against missile attacks. Politicians have been using the missile defense systems to assure the citizens of their firm intention to safeguard them. Therefore, they should implement their agendas by creating low-level defense systems to protect populated areas, which have been and will likely continue to be target for missile attacks, especially from groups such as Hezbollah.

*d. Threats*

Israel faces threats in its military defense system, and it needs to defend its citizens from these enemies.<sup>138</sup> This situation is largely caused by the strategic location of the country for its enemies, including states of Iran and Syria. Israel must possess specific defense strategies that would protect them against both the short-range and the medium-range ballistic missiles.

Another threat that Israel faces is the fact that the rogue nations, such as Iran and Syria, have increased the number of ballistic missiles and other weapons of mass destruction in the region. This issue has put Israel in a very difficult spot and criticized the Joint Cooperative Plan of Action. The strain of the attacks that Israel experiences from the Palestinians have continued to expose the country to more threats of attacks, and thus emphasizes the need to make sure that effective defensive measures are put in place.

In fact, the support by the United States is also a significant threat in that Israel's alliance with it leaves vulnerable to attack from U.S. enemies.<sup>139</sup> The involvement of the Israeli government in the cooperation with the United States government has dangerously corroded its relationships with U.S. enemies, and this worsens Israel's already strained relationships with its neighbors in the region.

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<sup>138</sup> Ochmanek et al., *U.S. Military Capabilities*, 90–94.

<sup>139</sup> *Al Jazeera*, “Why Saudi Arabia.”

Another threat stems from Israel's peace treaty with Jordan, which has a large Palestinian population. Israel cannot attack Jordan or its people; however, it is quite possible that some refugees in Jordan could use the situation to attack Israel regardless of the mutual peace and treaties. This situation puts Israel in danger of losing a key ally in the region,<sup>140</sup> leaving it to face more threats than it already manages.

Another threat to Israel would be if Iran would decide to create a weapon posing a nuclear threat to Israel, especially because of the presence of the Arrow system. There is also a group of critics who believe that the Iron Dome might be unable to defend Israel against some rockets that are in the air for less than 30 seconds and the Iron Dome is designed to work as a high-level defense system to protect the populated areas against attack.

The proliferation of missiles in the region is another considerable threat to Israel because now, the region becomes an active area in terms of the missile use and weaponry. This situation also has necessitated the acquisition of more missile defense systems by Israel to protect its population and its ally neighbors.<sup>141</sup> Another threat Israel faces is rockets from Hezbollah, which has previously attacked the cities of Haifa and Afula. The Israelis have been unable to destroy its launchers, which is a huge failure of the national defense strategies and systems.

From NATO's perspective, countries possessing the theoretical capacity and knowledge for ballistic missile development have been increasing.<sup>142</sup> The application of this knowledge could lead to the increased missile activities in the region, as countries such as Iran take advantage of the opportunity to develop and install stronger missile systems and possibly<sup>143</sup> weapons of mass destruction.<sup>144</sup> Therefore, as much as there is an increased

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<sup>140</sup> *Al Jazeera*.

<sup>141</sup> Samaan and Lasconjarias, "The Israeli Experience," 4.

<sup>142</sup> Richard Weitz, "Illusive Visions and Practical Realities: Russia, NATO, and Missile Defence." *Survival* 52, no. 4 (September 2010): 99–120.

<sup>143</sup> Samaan and Lasconjarias, 4.

<sup>144</sup> *Al Jazeera*, "Why Saudi Arabia."

effort to have a system of protection against missile attacks on Israel's part, there is also an increased risk of missiles development by other states.

#### **D. TBMD IN SAUDI ARABIA**

TBMD efforts in Saudi Arabia dates back to the early 1900s,<sup>145</sup> it has acquired most of its support in building own defense from the United States. The relationship between the two countries is based on the common interests in energy and security. Saudi Arabia has made great efforts to strengthen its borders by establishing partnerships with foreign countries, including the United States and China, to obtain military equipment to strengthen its defense forces.

##### **1. The Role of the United States in Saudi Arabian BMD**

The U.S. relationship with Saudi Arabia goes back to 1940. The partnership was officially sealed in 1945 in an agreement between King Abdul Aziz ibn Saud and the U.S. President Franklin Roosevelt. The agreement assured Saudi Arabia military protection by the United States in exchange for access to oil. During the first Gulf War in 1990, Saudi Arabia was vulnerable to attacks by Iraq, and the United States intervened in the conflict to protect its interests in oil reserves in the region.<sup>146</sup> The U.S.-Saudi alliance sought to oust Iraqi troops from Kuwait and prevent their infiltration into Saudi territory. Nevertheless, the United States and Saudi Arabia faced a period of strain relationships as a result of the 9/11 attacks on American cities upon the discovery that 15 out of 19 of the attackers were from Saudi Arabia. The tension was further reinforced in 2003 when Saudi Arabia refused to take part in the U.S.-led invasion of Iraq that aimed at striking the bases of Al Qaida.

However, under the Obama's administration (specifically between 2009 and 2010), the United States earned \$110 billion from selling arms to Saudi Arabia to enhance the

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<sup>145</sup> Naif Hethlain *Saudi Arabia and the U.S. since 1962: Allies in Conflict* (London: SAQI Books, 2010), 26.

<sup>146</sup> Hethlain, *Saudi Arabia*, 35.

defense of its forces against regional threats.<sup>147</sup> This decision induced various reactions, most of which were negative. This is in part because of a large number of civilian casualties in the war in Yemen, in which Saudi Arabia led a coalition to fight the Iranian-backed Houthi rebels. The provision of the arms is a reflection of the commitment of the United States to protect one of its key allies in the Arab region.

Since 2015, the United States has played a significant role in providing military support and advice, as well as logistical backing, for interventions in Yemen led by Saudi Arabia. According to Dalton, Shah, and Robbins, the main goal for this support is to preserve Saudi Arabia's territorial integrity as well as for the United Nations to recognize the government of Yemen.<sup>148</sup> Such interventions by Saudi Arabia have left it vulnerable to retaliatory attacks, thus highlighting the need for it to have a robust defense system. The assistance of the United States has manifested in the forms of mid-flight aerial refueling, sharing of intelligence, as well as assistance in targeting.

Saudi Arabia has also reported receiving an investment of about \$750 million in a form of a training program from the United States military forces to help limit civilian injuries and deaths in the bid to defend its borders. This further demonstrates the great influence that United States forces have played in the success of the Saudi Arabian defense systems.<sup>149</sup> The influence seemingly continues under the Trump administration, which has extended more support for Saudi Arabia in its war with Yemen forces.

In essence, the role of the United States in Saudi Arabia's TBMD system has been significant, and the key reason has been the desire to make sure that the country is well-protected. For instance, in 2014, Saudi Arabia focused on upgrading the Patriot Advanced Capability (PAC) 2 systems to the current PAC-3 systems to boost its defense against TBMs. The United States authorized the upgrade through the Department of Defense. The

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<sup>147</sup> Melissa Dalton, Hijab Shah and Timothy Robbins, "U.S. Support for Saudi Military Operations in Yemen," Center for Strategic and International Studies, March 23, 2018, <https://www.csis.org/analysis/us-support-saudi-military-operations-yemen>.

<sup>148</sup> Dalton, Shah and Robbins, "U.S. Support for Saudi Military."

<sup>149</sup> Dalton, Shah and Robbins.

upgrade came in the form of a \$1.7 billion Raytheon contract entailing a ground-system hardware and the support for equipment upgrades.<sup>150</sup>

Following the 2015 Camp David Summit, Saudi Arabia, along with other Middle Eastern countries (including Qatar and Kuwait), renewed their efforts with the United States to develop an integrated TBMD system. An integrated TBMD system would be an effective defense mechanism because it uses radars, early warning, and a surface-to-air missiles. Also, the United States favors the system as a regional safeguard.

Additionally, there have been extensive negotiations between the United States and Saudi Arabia over the upgrade of the Royal Saudi Navy's Eastern Fleet with the Saudi Naval Expansion Program II. The advantage of these negotiations is the measures discussed will strengthen Saudi Arabia effectively and help it protect its citizens against attacks from the sea. The United States has also taken the initiative to sell ships to Saudi Arabia to boost its naval base security.<sup>151</sup>

## **2. The Role of the U.S. Rivals in Saudi Arabia's BMD**

The battle for influence in the Middle East by outside countries (e.g., the United States, Russia, China) has been a major contributor to conflict and attacks for various Arab states. Based on its close relationships with the global superpower, the United States, Saudi Arabia has faced threats and direct attacks from its neighbors for many years.<sup>152</sup> These attacks came mainly from Iran through the Houthi forces in Yemen. For this reason, Saudi Arabia joined forces with other Arab states to form a coalition in an attempt to fight the Houthi forces. Under the coalition, several states sent troops to Yemen. Yemen accused Iran of arming the Houthi forces, and these accusations have led to an escalation of the tension in the Middle East. Iran has vehemently denied these accusations.

Across many years, both Iran and Saudi Arabia have raised concerns over the continued arms development in the region, development that continues despite both

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<sup>150</sup> Dalton, Shah, and Robbins.

<sup>151</sup> Hethlain, *Saudi Arabia*, 42.

<sup>152</sup> *Al Jazeera*, "Why Saudi Arabia."

agreeing to stop. Both of these countries are engaging in of arms race, which increases threats the region. Saudi Arabia's argument of the necessity of arms has been based on the need to protect its citizens and its two holy mosques against the increasing nuclear proliferation initiated by Iran.<sup>153</sup> Major rivalry between these two has emanated from differences in religious beliefs; Saudi Arabia is dominated by Sunni Muslims, while Iran is dominated by Shia Muslims.

Saudi Arabia warns that it will continue to engage in the arms race if Iran continues to develop the threatening ballistic missiles. The development Saudi Arabia's TBMD is to protect it against possible Iran missile attacks. As a key U.S. ally and party to the Treaty on Non-Proliferation of Nuclear Weapons of 1988, Saudi Arabia was provoked by Iran to join the arms race as a means to defend its territories.<sup>154</sup>

In early 2018, the Iranian-backed Houthi forces in Yemen launched missiles against Riyadh in Saudi Arabia. Nevertheless, with its BMD system, Saudi forces were able to intercept the attack; however, there were casualties.<sup>155</sup> The Saudis reported one death and the destruction of residential properties as a result of debris that fell on them. Occurrences such as these have intensified the tension among states in the Middle East and affected their economies as well. As much as Saudi Arabia has managed to intercept some recent missiles, several missile launches on Saudi coalition forces in Yemen during the period between 2015 and 2016 resulted in over 300 deaths and massive destruction of both property and equipment.<sup>156</sup>

### **3. The Role of Saudi Arabia's BMD**

In tandem with the backing of major countries, including the United States and China, Saudi Arabia has modernized its military capabilities. The country aims to be the most influential power in the Middle East through its sophisticated and highly development defense systems. Saudi Arabian missile defense plays a critical role in countering offensive

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<sup>153</sup> Hethlain, *Saudi Arabia*, 33

<sup>154</sup> Ochmanek et al., *U.S. Military Capabilities*, 77–83.

<sup>155</sup> Dalton, Shah, and Robbins, "U.S. Support for Saudi Military."

<sup>156</sup> Dalton, Shah, and Robbins.

attacks from its neighbors.<sup>157</sup> This system of defense has allowed the state to protect its borders against missile attacks from Iran through Houthi forces in Yemen.<sup>158</sup> Saudi Arabia has managed to anticipate and intercept missile attacks against its borders to ensure the security of its people.

Saudi Arabia has prioritized counterterrorism since the discovery that most of the attackers in the 9/11 event were Saudis. Additionally, it has considerably upgraded its security and intelligence in an effort to respond to terrorist threats both from within its borders and abroad. The upgrade has required it to negotiate with the United States to have its missile defense systems improved for the quicker detection of a threats. The presence of strong defense capabilities such as PAC-3 on the ground, AN/TPS-43 Radar, Oerlikon Skyguard, MIM-23 Hawk, and AN/FPS-117 Radar are effective measures that Saudi Arabia has put in place to counterterrorism effectively and secure the country against potential missile threats in general.<sup>159</sup>

In response to perceived threats from other countries, Saudi Arabia has most recently taken steps to create a one-unit umbrella organization, the Saudi military industries, to lead its defense efforts in terms of development and expertise. The decision is in line with its 2030 goals of having a strong defense force.<sup>160</sup> With this defense industry, Saudi Arabia looks to establish strategic partnerships so as to gain more modern technologies, skills, and military expertise to build its local defense capabilities to further ensure its security.

Accordingly, based on its 2030 plans, Saudi Arabia has focused on increasing the level of its domestic government spending, including defense spending. The provision of security has been no exception. The country has realized that it is necessary to effectively guard itself against all forms of attacks to attain the desired level of performance both socially and economically. According to the International Institute of Strategic Studies,

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<sup>157</sup> Dalton, Shah and Robbins.

<sup>158</sup> Ochmanek et al., *U.S. Military Capabilities*, 105–108.

<sup>159</sup> Ochmanek et al., 105–108.

<sup>160</sup> “Vision 2030 and Its Impact on Saudi Defense Spending (Economic Development Programme),” *Defense News* 31, no. 19–20 (May 2016).

official data from the kingdom indicates Saudi Arabia has spent high amounts for the promotion of security. For instance, it spent 12.5 percent of its gross domestic product on security measure in 2015, 12.61 percent in 2016, and 11.3 percent in 2017.<sup>161</sup> These figures are even higher than in the U.S. spending.

Apart from these successful implementation of TBMD and developing other land and air defense, it has also acquired the key inventory systems, which are interoperable with those of the United States, the UAE, and other key allies in the region.<sup>162</sup> Therefore, Saudi Arabia has focused on the continuous modernization of its systems of protection of its citizens through prioritizing innovations and spending on the TBMD systems.

#### **4. SWOT Analysis of Saudi Arabia's BMD**

Saudi Arabia's TBMD system is an essential asset of the Arab kingdom. This system is a significant source of opportunities and strengths that support Saudi Arabia's power in the Middle East. At the same time, it is a source of threat and weakness for this state.

##### ***a. Strengths***

The development and utilization of a BMD system require advanced equipment and infrastructure. Saudi Arabia is able to anticipate and intercept attacks over its borders faster and more effectively than the rest of Arab countries and thus limit casualties of the war. In such a manner, Saudi Arabia is secured properly from the potential air or land attacks from such countries as Iran. For example, in 2017 and 2018, the Saudi air defense force was able to intercept Burkan H-2 (a ballistic missile) fired by the Houthi rebels from inside Yemen with the support of Iran.<sup>163</sup> In addition, the country considers the strong defense systems a critical step toward the attainment of its 2030 security goals.

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<sup>161</sup> Anthony Cordesman, "Military Spending: The Other Side of Saudi Security," Center for Strategic and International Studies, March 13, 2018, <https://www.csis.org/analysis/military-spending-other-side-saudi-security>.

<sup>162</sup> Cordesman, "Military Spending."

<sup>163</sup> *Al Jazeera*, "Why Saudi Arabia."



*b. Weaknesses*

A major weakness for Saudi Arabian TBMD is the lack of proper training of the Saudi forces. Despite the country spending billions of dollars on military equipment, the Saudi defense force is still not as skilled as that of Iran. The international community criticizes Saudi Arabia because despite extensive funding allocated for the military, the country seems to be still be largely unprepared for large-scale attacks. The ineffective training has made it difficult for Saudi Arabia to single-handedly deal with the increasing threat of missile attacks in the region, which makes it vulnerable.<sup>164</sup>

Its TBMD system may provide a false sense of security to Saudi Arabia. The success the state achieved in intercepting the ballistic missile fired by Houthi forces could very easily make the Saudi forces believe that they have a very strong defense, giving the country an advantage over its enemies. This false sense of security makes the Saudi borders more vulnerable to attacks, especially surprise attacks, and penetration. The likelihood of the national government being caught off guard is not far-fetched.<sup>165</sup> Even though its TBMD system has proved reliable, Saudi Arabia should explore other avenues to improve missile threat detection.

A TBMD system is very costly. The cost of one of the purchases that Saudi Arabia made from the United States under the Obama administration to boost its BMD system was about \$115 billion.<sup>166</sup> This sum was high for any national economy; such a huge amount of money could have been invested in other areas of development instead of boosting the military power. Because of the high costs that were spent on the TBMD system, Saudi Arabia had to exceed its budget for the last seven years. In such a manner, critical areas such as healthcare did not receive adequate shares of the budget, which has raised huge concerns both inside and outside the country.

Any TBMD system can experience cases of malfunction due lack of technical expertise. There are a number of reports alleging that various missile launches failed when

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<sup>164</sup> Samaan and Lasconjarias, "The Israeli Experience," 3.

<sup>165</sup> *Al Jazeera*, "Why Saudi Arabia."

<sup>166</sup> Cordesman, "Military Spending."

Saudi Arabia tried to intercept rockets that targeted Riyadh from Yemen.<sup>167</sup> As mentioned previously, this failure has resulted in one death and significant damage to residential property.

Saudi Arabia greatly depends on its allies in the United States and Europe for its military hardware. In the case of a strained relationship between the kingdom and its allies, sanctions are likely to halt the further aid and defense assistance. This issue could serve as a huge blow to Saudi Arabia, which currently has no manufacturing plants to develop its own arms. Additionally, the situation could result in a weakened defense force, thus making it vulnerable to attacks from external sources.<sup>168</sup> Therefore, Saudi Arabia must be on good terms with these countries to ensure that it is benefitting continuously for what they have to offer in terms of military support. Any deviation from agreements would mean termination of treaties that would leave the country alone in its struggle with maintaining a strong security system.

### *c. Opportunities*

Saudi Arabia could use its BMD to improve its fight against the menace of terrorism in the Middle East. Therefore, it has the opportunity of contributing to the general stabilization of the region. In recent times, terrorist groups use more sophisticated arms and equipment both in the Middle East and elsewhere. Saudi Arabia is a heavy investor in the military equipment; thus, it can make strides to thwart these new developments.

In addition, Saudi Arabia could explore opportunities to establish its own manufacturing plants so as to lower its overreliance on allies in the United States, Europe, and China for the military assistance. Moreover, Saudi Arabia could establish partnership to learn the defense strategies of these countries and what they are doing for their security. As a result, Saudi Arabia would to implement TBMD systems properly to ensure that it attains its success in the protection of all citizens and territories. It would then have more

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<sup>167</sup> “Indian National Injured in Houthi Missile Attack on Saudi Arabia,” *BBC Monitoring Middle East*. March 31, 2018; “BRIEF: Mosque, House Hit by Houthi Missile Fragments in Saudi Arabia,” *Arab News*, last updated September 19, 2018, <http://www.arabnews.com/node/1374301/saudi-arabia>.

<sup>168</sup> *Al Jazeera*, “Why Saudi Arabia.”

confidence in the possibility of its own security. Furthermore, it would ensure independence as far as its defense goes in the case of any shifts in relationships with the aforementioned countries.

**d. Threats**

A TBMD system is associated with the lack of clear lines of responsibility and accountability. Saudi Arabia is able to defend and intimidate itself. The system in the wrong hands can be used to pursue personal interests such as gaining unreasonable control in an effort to assert the superior influence in the Middle East.<sup>169</sup>

The implementation of a TBMD system has a detrimental potential of resulting in an arms race in the region. This scenario is possible since the fear of such a race has existed between Iran and Saudi Arabia for many years because of the rivalry between them. Furthermore, Saudi Arabia has plans for the acquisition of its own nuclear weapons because it fears Iran's nuclear program. While the its TBMD system has been designed to operate in mid-air, Saudi Arabia nonetheless faces the threat of a high number of casualties and destruction of property if it fires its missiles due to fall out debris.<sup>170</sup> The associated damage and death can be unprecedented and difficult to estimate. In the past, a missile interception caused an explosion too close to the King Khalid International airport terminal.<sup>171</sup> Although travelers felt the impact, there were no casualties.

**E. TBMD IN JORDAN**

The Arab kingdom of Jordan is geographically located in the center of the Middle East and is considered a friend to all the other countries. Jordan is in a very strategic location, and its population is a mix of Christians and Muslims. It has been an ally of both the United States and Egypt since 1994, and it is at peace with Israel. In addition, Jordan

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<sup>169</sup> Ochmanek et al., *U.S. Military Capabilities*, 109–112.

<sup>170</sup> Dalton, Shah and Robbins, "U.S. Support for Saudi Military;" *Al Jazeera*, "Why Saudi Arabia."

<sup>171</sup> "The Missile Attack by Houthi Militias on King Khalid International Airport in Saudi Arabia (Statement by Foreign Press Secretary Norio Maruyama)," States News Service, press release, November 8, 2017, [https://www.mofa.go.jp/press/release/press4e\\_001785.html](https://www.mofa.go.jp/press/release/press4e_001785.html).

owns no oil reserves; due to limited resources, it depends largely on tourism for its revenue and foreign assistance, which is largely provided by the United States.

It has militant relations with the Palestinian and Islamist groups in the region. Its defense system is meant to protect the country from any missile attack from other countries mostly by counterattacking missiles from its enemies. Additionally, Jordan's seaport is within the short range of any type of attacks from the Islamist militants; however, Israel's missile defense system program covers the whole territory of Jordan.

### **1. The Role of the United States in Jordan's BMD**

Jordan hosted a United States TBMD system from 2013 to 2018, and neighboring countries did not look on this favorably. Much of the Middle Eastern population has a negative perception of the United States, which it believes to be seeking dominance in the region. The United States has focused on ensuring the defense of Jordan population and its allies such as Israel and Saudi Arabia.<sup>172</sup> Jordan has been one of the key beneficiaries of the TBMD umbrella that have been put in place by the United States in the Middle East.

Though it still maintains some of the coverage for its allies, United States has removed some of its TBMD batteries from four countries in the Middle East, including Jordan. This is due to the desire of the United States to shift the concentration from the countries developing missiles, for example, Russia, China, and Iran. The Patriot batteries are mobile air missiles meant for defending small areas and specific places, and so the United States has deployed the Patriot air defense batteries along the border between Jordan and Syria. The United States does not appreciate the Russian and Chinese influence in terms of the supply of the ballistic defense systems to such countries as Jordan; therefore, it has a strict position when dealing with Jordan.

It is worth noting that the United States has funded Israel's missile defense systems and coverage that extends over to Jordan and Egypt, both of which are worried about Iran's missile program. Jordan and Israel have a peace treaty, which allows Jordan to enjoy the protection of Israeli TBMD systems. Additionally, Israel is willingness to support Jordan

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<sup>172</sup> *Al Jazeera*, "Why Saudi Arabia."

in its development of a strong TBMD system.<sup>173</sup> The support of Jordan by Israel that is equally funded by the United States is an indication of the growing strength in the region and the realization of countries' set security goals.

Apart from funding, the United States has been instrumental in the provision of military assistance in the form of training and air force reinforcement in Jordan. The United States has contributed to Jordan's TBMD systems by bolstering it with the needed military equipment while also collaborating with the Jordanian military to provide the needed level of security.<sup>174</sup> Joint drills have become an important part of training, and they provide members of the armed forces in Jordan the opportunity to understand the best ways of defense. Additionally, joint training is key to boosting the security of the country and a strong system of defense for regional allies.

Israeli Arrow II ranges cover most parts of the western territories of Jordan, including the capital city, Amman, and Arrow III systems are in a position to counterattack the incoming missiles from Iran over Iraqi borders. Israel's Iron Dome can cover a 145 square mile radius and this provides security to Aqaba. Jordan is thus fully protected from the missile attacks even without its own TBMD system.

It is fortunate for Jordan that it has missile defense arrangements with Israel as U.S. assistance is waning. The United States seems to be gradually withdrawing its funding from Jordan for the development of a strong TBMD system. It has been experienced by the withdrawal of some of the TBMD systems that had been put in place. Without Jordan making other arrangements for missile defense, this could expose Jordan to more threats in the future.

## **2. The Role of the U.S. Rivals in Jordan BMD**

The United States has been funding the research and development projects in Israel, which has assured that Jordanians received protection from the Islamist State with the help of these TBMD systems. There has been an increase in the number of ballistic missiles in

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<sup>173</sup> Ochmanek et al., *U.S. Military Capabilities*, 125.

<sup>174</sup> Samaan and Lasconjarias, "The Israeli Experience," 6.

the Middle East.<sup>175</sup> Missile attacks have been used often in the region's wars. Nevertheless, according to a 2014 Congressional Research Service study, this kind of increase in these weapons will cause a lot of destruction and loss of lives.<sup>176</sup>

The acquisition of ballistic missiles is mostly fueled by the need be superior to other states in the region, to attack enemies, improve the nations' autonomy, and lastly to upgrade own capabilities in the war. Countries consider missiles to be a pragmatic investment; for example, India acquired the ballistic missiles to defend itself from China, and then Pakistan purchased missiles to protect itself from India. So too does Jordan faced the need to defend itself from neighbors.

### **3. The Role of Jordan's BMD**

Jordan has been in the midst of the Arab-Israeli wars and misunderstandings over the Palestinian issue, which threatens its stability. The country supports the Palestinians in their attempt for recognition of their political and national rights; yet Israel is Jordan's ally. The two are not at war despite the increase in the number of Palestinian refugees in Jordan. Moreover, the peace treaty protects Jordan from medium- or short-range missile attacks. Alliances notwithstanding, Jordan needs nonetheless needs missile defense systems. Jordanian TBMD systems include such elements as AN/TPS-77 radar and AN/TPS-43E radar to help in the detection and interception of the missile attacks. The strength of the defense systems in Jordan plays a critical role in securing the country's borders. One of the reasons for Jordan's involvement in the TBMD system is because it has weak internal factors and needs defensive assistance from other states.

Jordan does not have its own TBMD delivery system, and it can also be considered to be anti-missile since it is a party to the International Code of Conduct against Ballistic Missile Proliferation and a member of the Proliferation Security initiative.<sup>177</sup> Because of

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<sup>175</sup> *Al Jazeera*, "Why Saudi Arabia."

<sup>176</sup> "GAO Finds DoD Report on Homeland Missile Defense Offers Limited Insight," *Defense Daily*, July 18, 2014, <https://www.defensedaily.com/gao-finds-dod-report-on-homeland-missile-defense-offers-limited-insight/>.

<sup>177</sup> *Al Jazeera*, "Why Saudi Arabia."

this, it does not have its own missile technology creation opportunities, unlike other countries in the Middle East. However, the strong military systems provided by the United States and coverage by Israel under the treaty demonstrate Jordan's priority of protecting its people, including the many Palestinian refugees it hosts. Jordan has strived to secure the TBMD systems to ensure that it uses the best opportunities out of all available security options for protection.

The efforts to increase the military coverage over the Jordan Valley specifically add to the advantage of Israel over its enemies. The strategic location of the missile defense systems at the Jordan Valley provides both Israel and Jordan with the ability to intercept any missile threats effectively. In addition, it is difficult for enemies to detect their positions and targets to destroy the missile defense systems.

#### **4. SWOT Analysis of Jordan BMD System**

Jordan's TBMD system is a significant source of strength and opportunities that support Jordan's role in the Middle East as a mediator between Israel and Saudi Arabia. At the same time, it is a source of threat and weakness.

##### ***a. Strengths***

A strength that Jordan can easily draw on is the fact that it has no conflicts with any Arab countries; therefore, the missile attack on it is rather unlikely. Moreover, it has offered a place for refugees from Palestine in three different wars, something its pro-Palestinian neighbors can appreciate. In addition, it has been a refuge area for the Syrians fleeing their civil war. The ability to accommodate more refugees is an indication of the peaceful way that Jordan has adopted; this attitude is an advantage that will contribute to the success of its TBMD system.

The country also boasts a very stable political government; it is even termed the most autonomous state in the Middle East. Jordan is also rather egalitarian in that even refugees are not discriminated against in terms of employment opportunities; everyone can vie for high positions in the government despite their origin. In fact, the country provides

both humanitarian and security assistance to refugees with the financial support of other countries, including the United States.

Moreover, as previously mentioned, Jordan belongs to the anti-missile organizations. This policy is an advantage and because of it, the United States has been able to maintain a peaceful relationship with the country since the United States is working toward eradicating the nuclear proliferation. Although the majority of countries in the Middle East are seeking nuclear weapons through various means, Jordan does not have the capability or interest of holding these weapons.

Jordan also has the advantage of the Royal Jordanian Army, which is supplied with weapons by the United States and Britain. The air defense systems have been equipped with air missiles, aircraft guns, and other equipment that allows control of the nation's airspace and ensure the required coverage.<sup>178</sup> Due to its association and training with the high-power states, the members of the air defense forces are well trained to deal with any type of air strikes. Jordan's strategic location makes it easier to intercept any upcoming attacks against it effectively.<sup>179</sup> The country is always in a good position to counter the upcoming threats by developing a high-quality approach to defense.

Another strength is that the United States supports Jordan socially, politically, and economically. In fact, the United States assists the country with the needed security because of the conflicts in the region, the refugee influx, and most importantly the terrorist attacks in Jordan from the radical Islamist groups. The security contributes to Jordan's political stability. Jordan has joined efforts with the United States in the fight against terrorism through attacks on Islamic State of Iraq and Syria (ISIS) in Syria and Iraq. This decision has allowed the country to get a better military support from the United States, which increases its own security and political stability.

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<sup>178</sup> *Al Jazeera*.

<sup>179</sup> *Al Jazeera*.



***b. Weaknesses***

Jordan has no oil assets and has very limited resources that barely support it as a country. In essence, this issue forces the country to depend on the United States for economic and military support to protect itself from reaching poverty levels. Due to this association with the United States, the country has had to cooperate with the Israeli government, which has used the Jordan's Valley as a strategic location for placing the TBMD. Due to its stable government and good ties with most Palestinian, Jordan has been in the middle of all Arab-Israeli wars. As a result, the country has experienced influxes of refugees into its territories. Such a great number of refugees threatens and weakens the security of the state.

***c. Opportunities***

One of the major opportunities that Jordan has is that its economy receives funds and foreign aid from the United States. This assistance could be in the acquisition of the air-air missiles that its air forces need to defend the country from attacks or in the preparation for any attacks against others.

A stable political government in a region that is full of conflicts and wars is an opportunity of ultimate importance. As a neutral Jordan can protect people, especially the refugees, from missile attacks. This strategy can play a major role in ensuring the peace and stability among the nations in the Middle East.<sup>180</sup>

The alliance of Jordan and the United States, and the foreign aid it provides, plays a significant role in stabilizing the Middle East. In 2002, the two countries signed the U.S.-Jordan Free Trade Agreement. This arrangement definitely was a good opportunity for the country because the increases economic development of Jordan allowed it to purchase more weapons and armaments to be used for protection.

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<sup>180</sup> *Al Jazeera*.

**d. Threats**

Due to Jordan's alliance with the United States in the fight against terrorism, it faces a great threat from the ISIS and its allies, including Syria, since now, the country is considered the *betrayers* by Islamic extremists. Even within the country, militant groups of the ISIS managed to execute several assaults against the country and its population, such as the shooting in Al-Karak in December of 2016, because of its alliance with the United States.

In 2017, sections of an Israeli missile fired at Syrian missiles fired at Israeli planes on a mission to strike against Syria fell on Irbid, Jordan. The debris did not kill people, and Jordan did not appear to be the intended target. It was assumed that they were not targeting Jordan, but rather an Israeli air force jet.<sup>181</sup> Given that attacks still occur, one can conclude that despite security provided by Israel and the United States to Jordan, Jordan is not entirely protected. Jordan should have been able to detect this missile attack.

**F. CHAPTER SUMMARY**

According to the literature review, Israel, Saudi Arabia, and Jordan have prioritized the acquisition of strong TBMD systems to protect their territories against the missile threats that they face in the region. All three states have to deal with an increasing threats from Iran and Syria. This has led these countries to focus on protecting their populations through the implementation of the TBMD systems. Despite the high cost of TBMD systems, each of these countries has done its best to ensure that its citizens are secure from any potential attacks. It is worth noting that the United States has been a key partner of Israel, Jordan, and Saudi Arabia and helped them to achieve success in developing their own missile defense systems through financing the security projects. The most assistance has gone to Israel because of the numerous threats it faces the region. The United States has also given assistance to Saudi Arabia in the arms race with Iran by funding the research and development initiatives.

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<sup>181</sup> Dov Lieber and Judah Ari Gross, "Jordan Finds Chunks of Debris from Syria-Israel Missile Clash Two Large Cylinders Fall in Irbid Region: Nobody Injured," *Times of Israel*, March 17, 2017, <https://www.timesofisrael.com/jordan-finds-fragments-from-missile-interception-no-injuries/>.

Apart from the United States, other countries such as China, France, and the United Kingdom, have supported arming of these nations, thus allowing for the creation of different TBMD systems.<sup>182</sup> The strong defense systems have been supported by proficient training provided to armies of each country from other nations. In addition, budgetary allocations, especially by the Saudi Arabian government, have allowed ensuring that the nations' missile defense systems move toward the realization of their set goals in terms of defense and security.

Each country has specific strengths in terms of the utilization of its TBMD systems. In addition, each has weaknesses, opportunities, and threats associated with the utilization of such systems. It is vital for Israel, Jordan, and Saudi Arabia to realize their most significant strengths and use them to ensure their security. In addition, each country should look for ways of overcoming its weaknesses. There will always be threats, but their focus should be on the promotion of security with the view to curbing missile threats effectively.

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<sup>182</sup> Samaan and Lasconjarias, "The Israeli Experience," 3.

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## **IV. FINDINGS AND DISCUSSION**

### **A. INTRODUCTION**

So far, this study has demonstrated missile threats that Israel, Saudi Arabia, and Jordan face today. The same threats necessitate these three nations to come together and develop an integrated TBMD system to ensure their overall protection.<sup>183</sup> These threats include possible attacks by Iran and Syria. At the same time, Israel, Saudi Arabia, and Jordan can also anticipate attacks from enemies such as extremist groups, including ISIS or the Houthis in Yemen, who have already proven to be a crucial threat for Saudi Arabia. This chapter presents the findings of this study. In particular, these findings aim at demonstrating the key measures that can be applied by the three nations to defend themselves from the mentioned threats and ensure their security and that of the Middle East as a whole. Therefore, these findings address the key research questions for this study. These research questions are:

1. What is the role of the U.S. in the development and implementation of a TBMD system in the Middle East?
2. What are the possible avenues that can be used to facilitate the development of a comprehensive and integrated TBMD system in the Middle East?
3. What are the current challenges facing Israel, Saudi Arabia, and Jordan that thwart the development of a joint comprehensive and integrated TBMD system? How can these challenges be mitigated?
4. What are the key ways Israel, Saudi Arabia, and Jordan can cooperate and work together towards the development of a joint comprehensive and integrated TBMD system?

### **B. FINDINGS**

To answer these questions, the researcher derived key topics from available literature. Accordingly, the findings of this study illustrate the specific role that the United States plays in the development and implementation of a TBMD system in the Middle

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<sup>183</sup> Ochmanek et al., *U.S. Military Capabilities*, 130.

East.<sup>184</sup> Furthermore, these findings also include useful information on possibilities to develop a comprehensive and integrated TBMD system in the Middle East.<sup>185</sup> Findings of the study also include current challenges that Israel, Saudi Arabia, and Jordan face today in regard to the development of a joint comprehensive and integrated TBMD system and how they may be mitigated. Additionally, the findings of this research study also demonstrate the key ways that Israel, Saudi Arabia, and Jordan can cooperate with each other to develop a joint comprehensive and integrated TBMD system.

In addition to the presentation of the findings of this research study, the discussion includes their interpretation. Finally, the discussion includes not only understanding the findings but also assessing the degree to which these findings correspond to the available literature.

# **1. Research Question 1: What Is the Role of the United States in the Development and Implementation of a TBMD System in the Middle East?**

To understand the role of the United States in the development and subsequent implementation of a TBMD system in the Middle East. First, the United States changes the focus of its missile defense initiatives from one centered on the geographical United States to the regional one. For quite some time, the United States has focused on developing missile systems that focus on the defense of not its own cities but those of its allies.<sup>186</sup> In addition, one could argue that the United States is more concerned with defending its own interests as opposed to assisting allies in these regions.

Another essential missile defense role that the United States adopted for its allies abroad is that of a supplier.<sup>187</sup> As such, not only is United States is the largest developer and user of missile defense systems in the world, it is the main supplier of missile defense

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<sup>184</sup> Samaan and Lasconjarias, "The Israeli Experience," 2.

<sup>185</sup> *Al Jazeera*, "Why Saudi Arabia."

<sup>186</sup> Ochmanek et al., *U.S. Military Capabilities*, 120–124.

<sup>187</sup> *Al Jazeera*, "Why Saudi Arabia."

technology in the Middle East.<sup>188</sup> The U.S. Army fielding the PAC-3 defense system in the region demonstrates this role of the United States in missile defense abroad.<sup>189</sup> Furthermore, the U.S. Army also fields the heavy THAAD exoatmospheric system in Middle East as well.<sup>190</sup> In addition, these activities of the United States abroad include the deployment of an antimissile version of the AEGIS system by the U.S. Navy.<sup>191</sup> However, this role of the United States in missile defense abroad also has an economic dimension. The deployment of a BMD systems is very profitable for companies dealing with the arms production from the United States. Despite this fact, the American interest in the development of such a system exceeds potential economic gains.<sup>192</sup>

*a. The U.S. Missile Defense in Europe*

The understanding of U.S. role in missile defense in Europe and its interactions with European countries on the subject can offer insight into U.S. involvement with missile defense in the Middle East. The 2009 U.S. bilateral negotiations were vital in U.S. participation in the development of the missile defense in Europe. These bilateral talks resulted in the placement of missile interceptors in the Czech Republic and Poland. In these cases, the specifications of such a defense system were based on the U.S. allies security needs.<sup>193</sup> At the beginning of the presidency of George W. Bush, the United States was gradually developing a fear of a potential attack from Iran. The nation arrived at the startling realization that it was not in a position to protect itself from such an attack. Therefore, it made the decision to establish an additional site that would allow protection against possible missiles from eastern trajectory.<sup>194</sup> In such a manner, Europe was

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<sup>188</sup> Samaan and Lasconjarias, "The Israeli Experience," 5.

<sup>189</sup> Michael Puttre, "Patriot Missiles in Middle East to Be Upgraded," *Journal of Electronic Defense* 24, no. 6 (June 2001).

<sup>190</sup> John Liang, "MDA Seeks Information on Deploying THAAD to Middle East," *Inside Missile Defense*. June 22, 2016, <https://insidedefense.com/inside-missile-defense/mda-seeks-information-deploying-thaad-middle-east>.

<sup>191</sup> John H. Cushman Jr., "U.S. Expecting to Send Large Cruisers to Gulf," *New York Times*, May 31, 1987.

<sup>192</sup> Ochmanek et al., *U.S. Military Capabilities*, 43–45.

<sup>193</sup> *Al Jazeera*, "Why Saudi Arabia."

<sup>194</sup> Ochmanek et al., *U.S. Military Capabilities*, 127–129.

considered the most suitable option to intercept a ballistic missile that might attack the United States on the East Coast. While it may seem particularly selfish for the United States to lend its missile capability to other nations out of the need to safeguard its own well-being, it is still a good opportunity because nations, under these agreements, are protected from potential attacks as well.

***b. Defending against Regional Threats***

The role of the United States in the development and implementation of a TBMD system in the Middle East is illustrated by its activities to ensure defense against regional threats. As it currently stands, the U.S. has sufficient protection against potential threats of limited attacks given the huge investment it has allocated over the last few years for the Ground-based Midcourse Defense system. Furthermore, at the moment, the United States possesses the ability to counter any projected threats from key adversaries in the world, including Iran and North Korea. Nonetheless, the United States has been working toward integrating defense capabilities at the regional level in the Middle East.<sup>195</sup>

The United States is known to support the process of strengthening the regional missile deterrence architecture, which should be based on a solid foundation characterized by strong collaborative relationships. In respect to the Middle East nations, there is a need to develop a strong cooperative relationship between countries in this region. In addition, the United States builds alliances based on productive plans and actions that enhance the allied security.<sup>196</sup> It implies that allies should have an equal opportunity to contribute to the defense of their common interests.

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<sup>195</sup> Samaan and Lasconjarias, "The Israeli Experience," 3.

<sup>196</sup> *Al Jazeera*, "Why Saudi Arabia."



**2. Research Question 2: What Are the Possible Avenues That Can Be Used to Facilitate the Development of a Comprehensive and Integrated TBMD System in the Middle East?**

Some of the key avenues to facilitate the development of a comprehensive and integrated TBMD system in the Middle East include building new missile defense facilities, developing integrated training exercise, and reliable logistical support.

***a. Facilities***

Facilities are the key avenues for fostering the development of a comprehensive and integrated TBMD system in the Middle East by providing a means of expansion of interoperability and improvement of flexibility as well as the resilience of the TBMD system.<sup>197</sup> The governments of Saudi Arabia, Jordan, and Israel should enhance a joint utilization and collaboration to ensure the availability of the security facilities for the missile defense system. One point to consider is site surveys of missile defense facilities to determine the degree to which they are appropriate for use in the course of developing the defense system.

***b. Training and Exercises***

Training and exercises also serve as a key avenue to foster the development of a comprehensive and integrated TBMD system in the Middle East. Israel, Saudi Arabia, and Jordan should carry out effective multilateral training and exercises<sup>198</sup> that take place both inside and outside these countries.

***c. Logistic Support***

Logistical support is another potential avenue for fostering the development of a comprehensive and integrated TBMD system in the Middle East. This support could include the supply, transportation, maintenance, medical services, and engineering. Logistical support is essential in ensuring that Israel, Saudi Arabia, and Jordan are able to provide the teams responsible for the development of the defense system with necessary

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<sup>197</sup> Army Technology, "Arrow 2 Theatre Ballistic Missile."

<sup>198</sup> Samaan and Lasconjarias, "The Israeli Experience," 5.

logistics.<sup>199</sup> Therefore, mutual logistic support will be provided whenever necessary. However, key aspects that define the specifics of the support must be agreed on by the three governments.

**3. Research Question 3: What Are the Current Challenges Facing Israel, Saudi Arabia, and Jordan That Thwart the Development of a Joint Comprehensive and Integrated TBMD System? How Can These Challenges Be Mitigated?**

The key challenges to a Middle East TBMD and methods of their mitigation of financial constraint, long-term obligation requirement, local and international politics, TBMD system inefficiencies, and strategical asymmetries.

**a. Financial Constraint**

Financial constraint is one of the key challenges that has thwarted the development of a joint comprehensive and integrated TBMD system in the Middle East. It is a crucial challenge given the fact that each of the three nations (Saudi Arabia, Jordan, and Israel) has different financial capabilities.<sup>200</sup> Hence, it is not possible for each of them to contribute uniformly to the development of a TBMD system. Therefore, it is possible they will disagree on the issue of financial contributions, which would likely delay the development of this TBMD system. With time, this researcher predicts that finances will become even more problematic because the cost of such a venture is higher than other development programs. Consequently, it is not possible to make simple and accurate projections of this cost even using historical experience.

However, there have been attempts to explain it for several reasons. Missile defense programs are a considerably political issue. Therefore, nations can cooperate or reject the possibility of the TBMD system due to political pressure. At the same time, determining the cost of developing such a system can be difficult because of technical challenges. Specifically, there is a sense of underestimation of these challenges.<sup>201</sup> Underestimating

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<sup>199</sup> Ochmanek et al., *U.S. Military Capabilities*, 135–139.

<sup>200</sup> Samaan and Lasconjarias, “The Israeli Experience,” 6.

<sup>201</sup> Army Technology, “Arrow 2 Theatre Ballistic Missile.”

the costs or under financing a TBMD system could lead to developing a missile system that cannot respond adequately to threats.

Additionally, the problem of cost and financial constraint is a consequence of the perception that such a system is only useful in cases of urgent missile threats. This implies that in cases where threats are not imminent, political leaders could perceive the need for such a defense system to be not as urgent. Therefore, the government may allocate only limited financial resources for this system and its development. However, this fact indicates the need for Israel, Saudi Arabia, and Jordan to take funding into consideration in the course of developing a TBMD system.

In dealing with the challenge of implementing a TBMD system, it will be critical for all three nations to recognize and accept each other's financial capabilities and limitations. It at least one of the nations might have to contribute more another for the development of the joint TBMD system.<sup>202</sup> The nations should also consider avoiding becoming resentful with each other and keep in mind the need to come together to develop a system to protect them well against their mutual adversaries.

***b. Obligations Associated with the Creation of Such a Defense System***

Creation of a joint comprehensive and integrated TBMD system comes with obligations for Israel, Saudi Arabia, and Jordan. The development of national defense capabilities results in obligations for the involved parties, especially in the upkeep and maintenance of such a system, which is likely to be costly. For this reason, some disagreements will likely occur over the role of each nation in upkeep and maintenance. Some of these difficulties may be with respect to the financial responsibility and human resources. Accordingly, the inability to address issues like these could push the states of Israel, Saudi Arabia, and Jordan away cooperation for the creation of a joint comprehensive and integrated TBMD system. Without such cooperation, they cannot achieve the aim of an integrated TBMD.

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<sup>202</sup> Ochmanek et al., *U.S. Military Capabilities*, 140–146.

This cooperation challenge can be mitigated through the establishment of interim steps. Such acts could help if one of the nations is struggling with its obligations in the development of a joint integrated TBMD system. The significance of this initiative is that developing the system gradually would alleviate the pressure of obligations of these. These steps could include dialogues about the defense system and its significance for their individual and overall security.<sup>203</sup> Dialogues could go long way to build confidence to foster focus the development of the structure necessary for the positive transformation of the security relations of Israel, Saudi Arabia, and Jordan.

*c. Domestic Politics and Foreign Policy*

Politics will play a significant role in determining any potential cooperation between Jordan, Israel, and Saudi Arabia developing a joint comprehensive and integrated TBMD system, particularly given the relationship between national politics and foreign policy. Many nations, including Israel, Saudi Arabia, and Jordan, make decisions (e.g., those related to defense) based on the political temperature of their nations.<sup>204</sup> Due to the growing trend in the Middle East toward democratization, citizen input has become a key method of defining national priorities. Accordingly, one can expect that the foreign policy of these three states will largely differ when it comes to developing such a TBMD system.<sup>205</sup> Thus, these nations would need to reflect upon their decisions carefully in the light of the balance of domestic political power.

Mitigating this challenge with regard to cooperation and development of a joint comprehensive and integrated TBMD system could be achieved by changing the perspective of the political teams and agencies that make decisions concerning the security of these nations. The decision to tackle implementation of a TBMD is in the interest of all three states. Furthermore, achieving regional stability, to which an integrated TBMD contributes, is essential for the creation of necessary opportunities to promote a better economic situation for all involved states.

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<sup>203</sup> Army Technology, “Arrow 2 Theatre Ballistic Missile.”

<sup>204</sup> *Al Jazeera*, “Why Saudi Arabia.”

<sup>205</sup> Ochmanek et al., *U.S. Military Capabilities*, 140–142.

*d. Inefficiency Associated with a TBMD System*

The idea that TBMD system could lack efficiency is also a key challenge. A 2017 RAND report on feasibility, with focus on understanding the application of a TBMD system to both Europe and the Gulf region, illustrated the effectiveness of an integrated TBMD system. According to the report, the total number of antiballistic batteries required for effective missile defense is lower if the batteries are interconnected to form a single regional system.<sup>206</sup> This viewpoint has served as one of the key reasons for Israel, Saudi Arabia, and Jordan to express doubts over joining forces to develop an integrated TBMD system.

Addressing this challenge of inefficiency requires expertise in the field of missile defense. The three nations will need to identify the key and trustworthy experts that they can consult with so that their TBMD system is efficient. The best source of these experts is the United States given that it is the leading power in developing defense systems, and it has close ties with these nations.

*e. Strategic Asymmetries*

To a large extent, strategic asymmetries will impact the degree to which Israel, Saudi Arabia, and Jordan are willing to come together for the purpose of developing a joint comprehensive and integrated TBMD system. Strategic asymmetries hinder the cooperation in security affairs as they make it quite difficult to identify and justify the tradeoff of such cooperation. The specific key asymmetries that could complicate the situation include demographic, geographic, and topographic issues. Demographic asymmetries refer to the disparity in the size of the population of these states<sup>207</sup> and include differences in terms of the technological sophistication, education levels, and homogeneity or heterogeneity. Geographic asymmetry refers to the key differences in the strategic depth.<sup>208</sup> These challenges may thwart the cooperation for developing a joint comprehensive and integrated TBMD system because of their ability to cause serious

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<sup>206</sup> Ochmanek et al., 150.

<sup>207</sup> Samaan and Lasconjarias, “The Israeli Experience,” 6.

<sup>208</sup> Ochmanek et al., *U.S. Military Capabilities*, 66–70.

security dilemmas. For instance, Israel lacks strategic depth; this factor has determined its security policies for a long time.<sup>209</sup> In this case, this will have an influence on the other two nations' willingness to cooperate with Israel toward the development of this defense system.

When it comes to Jordan, Israel, and Saudi Arabia pursuing strategies of mitigating the above challenges, one can see that geographic and demographic asymmetry challenges cannot actually be eliminated; however, it does not mean that they cannot be mitigated. This could be achieved by ensuring that these challenges matter less when it comes to reaching an agreement for the cooperation with the view to developing the TBMD system.<sup>210</sup> It can entail the reduction of the relevance of decision makers' calculations. It will not be an easy task; nonetheless, it is possible.

Finally, topographic asymmetries consider particular geographic features that have the potential to place one state in a less favorable situation as compared to that of its neighbors. Therefore, if any of these three states show topographic asymmetry to its neighbors, the cooperation with other states might become difficult.

#### **4. Research Question 4: What Are the Key Ways Israel, Saudi Arabia, and Jordan Can Cooperate and Work Together towards the Development of a Joint Comprehensive and Integrated TBMD System?**

Some of the key ways Saudi Arabia, Jordan, and Israel can cooperate and thus develop a joint comprehensive and integrated TBMD system include the transfer of advance defense technologies, enhanced operational coordination, multilateral planning, alliance coordination mechanism, and sharing of intelligence and surveillance.

##### ***a. Transfer of Advanced Defense Technologies***

The transfer of advance technologies to Jordan, Israel, and Saudi Arabia could go a long way in fostering the development of a comprehensive and integrated TBMD system

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<sup>209</sup> Dalton, Shah and Robbins, "U.S. Support for Saudi Military."

<sup>210</sup> Army Technology, "Arrow 2 Theatre Ballistic Missile."

in the region. Since none of the countries has all the required technology, transference would facilitate the creation of integrated data of a missile defense system as well as to help identify the key weaknesses in the nations' individual defense systems.<sup>211</sup> Transference of technology would also further serve to bring these nations closer together as they work on a TBMD system.

***b. Enhanced Operational Coordination***

Enhanced operational coordination among Jordan, Israel, and Saudi Arabia could serve as an avenue for to facilitate the development of a comprehensive and integrated TBMD system in the Middle East. This type of coordination for the flexible and responsive command and control would serve as a key capability for nations in the region. The governments of Israel, Saudi Arabia, and Jordan need to acknowledge the significance of collocating operational coordination functions and its significance in strengthening the cooperation among them.<sup>212</sup> For instance, colocation could be a useful method to exchange their human resources and information sharing as well as fostering the coordination from a time of peace.

***c. Multilateral Planning***

Multilateral planning is another significant avenue that Jordan, Israel, and Saudi Arabia could use to facilitate the development of a comprehensive and integrated TBMD system in the Middle East. Various governments of this region could come together and develop multilateral plans to ensure a smooth and effective execution of coordinated operations by their defense forces tasked with running the TBMD system, which would allow these governments to establish trustful relationships with each other.<sup>213</sup> With more trust, they will more readily exchange relevant information, including data for the identification of operational and logistic support requirements appropriately and in advance. In this case, data sharing would be significant to ensure they take a flexible,

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<sup>211</sup> Samaan and Lasconjarias, "The Israeli Experience," 4.

<sup>212</sup> Dalton, Shah and Robbins, "U.S. Support for Saudi Military."

<sup>213</sup> Ochmanek et al., *U.S. Military Capabilities*, 72–80.

timely, and proper response in accordance with a potential threat. Furthermore, relevant agencies of the nations involved in the talks would be included in the planning, and then the three governments would carefully implement of these plans.

***d. Alliance Coordination Mechanism***

Alliance coordination mechanism provides another way for Israel, Saudi Arabia, and Jordan to cooperate and work together toward the development of a joint comprehensive and integrated TBMD system. This mechanism is even more useful given that persistent and emerging threats have the potential to have serious and immediate consequences for the peace and security of these nations.<sup>214</sup> Therefore, to successfully to address issues affecting the security of these nations or any other issue requiring an alliance response, an alliance coordination mechanism would be the most useful method. The mechanism would be vital in enhancing the policy and operational coordination related to TBMD activities. In addition, this mechanism could also lead to timely information sharing, including the development and maintenance of common situational awareness of any imminent danger relating to missile attacks against these states. While ensuring that this coordination is effective, it would be necessary for the three governments to implement the key procedures and required infrastructure.

***e. Sharing of Intelligence and Surveillance***

Sharing of intelligence and surveillance is yet another useful way for Israel, Saudi Arabia, and Jordan to cooperate and work together toward developing a joint comprehensive and integrated TBMD system. Information sharing is critical as a means of identifying any potential threats to the peace and security of these nations. Therefore, as a consequence of this intelligence and surveillance, the three nations would be better placed to work together to develop an effective defensive system. The extent of cooperation in respect to this sharing of intelligence and surveillance would also include effective coordination among the relevant agencies of these nations, and each nation would carry

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<sup>214</sup> Jaganath Sankaran, *The United States' European Phased Adaptive Approach Missile Defense System: Defending against Iranian Threats without Diluting the Russian Deterrent* (Santa Monica: RAND Corporation, 2015), 33–37, [https://www.rand.org/pubs/research\\_reports/RR957.html](https://www.rand.org/pubs/research_reports/RR957.html).



out intelligence and surveillance activities based on own capabilities and assets.<sup>215</sup> This could lead to nations more than willing to join efforts related to intelligence.

## C. SUMMARY OF THE FINDINGS

Summary of findings are illustrated in Table 1.

Table 1. Summary of Findings

<b>Research Question 1:</b> <i>What is the role of the U.S. in the development and implementation of a TBMD system in the Middle East?</i>	<b>Research Question 2:</b> <i>What are the possible avenues that can be used to facilitate the development of a comprehensive and integrated TBMD system in the Middle East?</i>	<b>Research Question 3:</b> <i>What are the current challenges facing Israel, Saudi Arabia, and Jordan that thwart the development of a joint comprehensive and integrated TBMD system? How can these challenges be mitigated?</i>	<b>Research Question 4:</b> <i>What are the key ways Israel, Saudi Arabia, and Jordan can cooperate and work together towards the development of a joint comprehensive and integrated TBMD system?</i>
U.S. is changing its missile defense initiatives from the homeland to the regional one.	Facilities	Financial constraint	Transfer of advanced defense technologies
U.S. missile defense example in Europe.	Training and exercises	Obligations associated with the creation of such a defense system	Enhanced operational coordination
Defense against regional threats.	Logistic support	Domestic politics and foreign policy	Multilateral planning.
		Inefficiency associated with such a system	Alliance coordination mechanism
		Strategic asymmetries	Sharing of intelligence and surveillance

<sup>215</sup> Army Technology, "Arrow 2 Theatre Ballistic Missile."

## D. DISCUSSION

With regard to development and implementation of a TBMD system in the Middle East, the role of the United States is that of collaborator, advocate, and supplier of the architecture for such a system.<sup>216</sup> These roles have made the U.S. allies in the region, including Israel, Saudi Arabia, and Jordan, which remain highly dependent on defense, especially against missile-related threats.

For a long time, the United States has been advocating the development of an integrated TBMD system by its allies in the Middle East.<sup>217</sup> This initiative can be traced back to the Clinton administration, which promoted the creation of a system by the GCC. This policy has been developed despite the reluctance of many of America's powerful allies with regard to such a system.<sup>218</sup> The 2008 conference concerning the projected development of a BMD in the Middle East in Bahrain illustrates the U.S. commitment. The then-Secretary of State Robert Gates explained the role of the United States in the development of a TBMD system to work on bilateral and multilateral basis in the region in order to bring about the establishment of a system to oversee the protection of its facilities and its allies. This study identifies a number of key avenues (e.g., facilities, training and exercises, and logistic support) necessary for the development of a comprehensive and integrated TBMD system in the Middle East. These avenues provide the strategies for the development of an integrated TBD system and highlight what each nation in this region needs to consider and contribute to the success of the common cause.<sup>219</sup> Therefore, these avenues indicate the platform that is to provide guidance for a TBMD system that could serve the entire region.

According to the findings, there are a number of key challenges that Israel, Saudi Arabia, and Jordan face that have the potential of hindering the development and implementation of an integrated TBMD system. For these nations to be able to come

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<sup>216</sup> Sankaran, *The United States* 40–43.

<sup>217</sup> Ochmanek et al., *U.S. Military Capabilities*, 150–154.

<sup>218</sup> Dalton, Shah and Robbins, “U.S. Support for Saudi Military.”

<sup>219</sup> Sankaran, *The United States*, 45–47.

together and join their resources, including financial, technological, and human assets, they must first be able to overcome such challenges. The failure to address these challenges means that the three nations would be unable to reach an agreement on the key specifics of developing the defense system, for example, on the role of each country in this process.<sup>220</sup> The key challenges included financial constraint, obligations associated with the creation of such a defense system, domestic and foreign policy, inefficiency associated with such a system, and strategic asymmetries.

What stands out the most about these challenges is the fact that they are based on the national pride and desire of each nation to retain to the sense of its own independence and sovereignty. However, the successful development of such a system would require these nations to come together and set aside any sense of individualism. To achieve this aim, these nations would have to choose between their national pride and their security well-being. Additionally, they would need to understand that the protection of their borders is much more vital than their national pride.<sup>221</sup>

TBMs can be rapidly transformed into weapons of terror by terrorist groups and enemy states. The terrorist groups are always ready to take advantage of any advanced systems to their own advantage. With the continuing innovations of TBMs, there is a threat that the terror groups and enemy states, such as Iran, could transform them into weapons of the mass destruction. As a country that intensively develops arms for its own security, Iran could take the same idea and lead to more sophisticated attacks that are hard to intercept and detect, thus exposing other countries to more risk.

In addition, this thesis concludes that Israel, Saudi Arabia, and Jordan can overcome all the challenges inhibiting their ability to cooperate on developing a joint TBMD system. However, it requires them to look for the ways of fostering cooperation between them. The key strategies that could be used to facilitate cooperation include the transfer of advanced defense technologies, enhancement of operational coordination, multilateral planning, developing an alliance-based coordination mechanism, and sharing intelligence and

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<sup>220</sup> Sankaran, 43–44.

<sup>221</sup> Dalton, Shah, and Robbins, “U.S. Support for Saudi Military.”

surveillance. To a large extent, this sense of cooperation would be useful in reducing the degree upon which these nations are depend on the United States for their missile protection. The literature demonstrates that Israel, Saudi Arabia, and Jordan largely depend on the United States for missile-related technologies, knowledge, and overall from missile attacks in the region.<sup>222</sup> However, what they fail to realize is the potential that they have to develop their own missile defense system without the aid from the United States by combining what they all have to offer for such a mission. For instance, Israel has one of the most advanced missile defense systems in the Middle East. In addition, it has pursued active research and development for missile programs as it strives to protect itself from Hezbollah guerrillas, Hamas, and Iran. In its turn, Saudi Arabia is one of the largest producers of oil in the region. For this reason, Israel and Saudi Arabia have the financial capability to support the development of such a system.<sup>223</sup> Jordan could use its strategic location for the development of such a system, and it could test the system in the Jordan Valley. Therefore, the cooperation of these three nations is a huge possibility that will boost the process a joint and integrated TBMD system for their protection against missile attacks.

## **E. CHAPTER SUMMARY**

This chapter addressed the key research questions developed for this study and presented analysis of the data for the study. It demonstrated the particular role that the United States could play in facilitating the development and implementation of a TBMD system in the Middle East. According to the results of this thesis study, this role is based on the U.S. decision to change the focus of its missile defense from the homeland to the regional one. The results of this study also show that Saudi Arabia, Jordan, and Israel could use some key avenues to develop a comprehensive and integrated TBMD system, and this study identifies useful strategies the nations could use to boost the progress of developing such a system. Additionally, they should serve as a roadmap for nations to find the right path to develop a TBMD system.

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<sup>222</sup> Cordesman, "Military Spending."

<sup>223</sup> Sankaran, *The United States*, 45–47.

Moreover, the results of this study reveal that developing such a system is challenging because of difficulties associated with Saudi Arabia, Jordan, and Israel coming together and showing their willingness to cooperate. Nonetheless, this study includes ways to mitigate these challenges, which if implemented, would result in strong cooperation. These strategies would create favorable cooperation to enable Saudi Arabia, Jordan, and Israel to willingly share knowledge and technology for the development of an effective defense system.

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## **V. SUMMARY, CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS FOR FUTURE STUDIES**

### **A. SUMMARY OF THE STUDY**

The missile threat to the Middle East, particularly to the U.S. allies in this region and including Israel, Saudi Arabia, and Jordan, has increased significantly in recent years. Russia, China, and North Korea remain the main missile suppliers of the ballistic missiles, which is of key concern given their role in the proliferation of missile-related weapons in the enemies of these three states. This thesis found that Russia is an exporter of ballistic missiles and nuclear technology to Iran, one of the key threats to these U.S. allies, particularly Saudi Arabia. China has been the key exporter of missiles to both Iran and Pakistan. This cooperation also includes the provision of missile assistance. North Korea also remains a significant supplier of ballistic missiles and associated components. The proliferation of missiles in the Middle East has resulted in a number of concerns. One of the most crucial concerns in the region is Iran's acquisition of nuclear weapons. Furthermore, many fear that some already nuclear nations are more likely to increase their inventories, including the acquisition of more ballistic missiles. In addition, it is equally likely that there are other non-state groups that have acquired or shown interest in acquiring these missiles. The regions prolific missiles could easily be used in some regional conflicts. This scenario would be harmful to not only Israel, Saudi Arabia, and Jordan but also the entire Middle East.

Chapter I of this thesis provided an overview of the entire research. It began by introducing the research question about the missile proliferation in the Middle East, key participants, and how this process threatened Israel, Saudi Arabia, and Jordan. The proliferation of missiles in the region poses a threat to the social and security well-being of these states. Chapter I defined and explained the seriousness of the problem as well as the possibility of missile attacks against these states aggravated by their close ties with the United States. However, these states lack an effective defense system against such an attack. Accordingly, the chapter also defined the rationale of the study and called for the development of a joint and integrated TBMD system, which would require the three nations

to come together, combine their resources, and efforts to develop a system to effectively protect them all.

Chapter II described the research methodology of this study. It included a description of the key methods the researcher used to carry out the study. Overall, the researcher utilized the secondary research design, which used the available data for exploring the research topic and addressing research questions. In addition, the chapter highlighted the key ethical considerations and key limitations. These are necessary for the transparency of this study and thus improve its validity and reliability.

Chapter III focused on the comprehensive literature review and analyzed individually the key threats facing Israel, Saudi Arabia, and Jordan. The key components of this review are TBMD systems in these three countries. This chapter also reviewed the available literature on the role of the United States in each of the nation's TBMD, the role of the U.S. rivals in each of these nations' TBMD, the role of each individual nation in their own TBMD, and a SWOT analysis of these systems.

The review of the literature indicated that Israel showed great commitment toward the development of its TBMD. The U.S. played a crucial role in the TBMD of this state it by co-financing this defense initiative mainly because Israel was one of its key allies in the Middle East. It also helped this state in testing its missile defense system. This vital role was witnessed in its contribution towards research and development for the implementation of missile defense systems. At the same time, the U.S. rivals have also played an instrumental role in this nation's BMD as suggested by the literature review. The same was evidenced by the actions of Russia, Iran, China, and North Korea in the Middle East. The terrorist groups of Hezbollah and the Hamas also played a vital role in Israel's BMD. In its turn, the role of Israel's ballistic missile defense was defined by its capability to intercept hostile missile attacks.

Regarding the SWOT analysis of Israel's ballistic missiles, the strengths that were identified included the U.S. partnership that resulted in the creation of the multilayered missile defense equipment, improvement of the Arrow system, acquisition of nuclear warheads, high capability of the BMD, integration of the Iron Dome, and overall success



of the missile defense program. As revealed by the literature review, the weaknesses of this nation's ballistic missile included the small size of the country that placed it at risk of its own missiles and problems with the execution and machines. Opportunities included the presence of such allies as Egypt and Jordan, the U.S. partnership and funding, and the potential for the creation of low-level defense systems. Finally, the key threats to Israel's ballistic missile included military defense threat, the high proliferation of ballistic missiles, and the peace package with Jordan, Iran, countries with potential capability and knowledge for the creation of ballistic missile.

The review of literature also provided the assessment of Saudi Arabia's TBMD. The literature review indicated that Saudi Arabia was one of the nations with the earliest knowledge of these missiles. The U.S. engaged in the spread of these ballistic missiles in this nation during the World War II. This role was further seen during the Obama administration when the United States provided Saudi Arabia with a considerable number of arms with the intention of ensuring its protection against regional attacks. Furthermore, currently, the United States continues to be directly involved in the development of TBMD of this nation. This review of literature also assessed the role of the U.S. rivals in Saudi Arabia's BMD. In such a manner, the engagement of the United States in the matter urged American rivals to join the arms race with the view to gathering the maximum number of missiles. Concerning the role of Saudi Arabia's BMD, the literature showed that the country was able to carry out a modernization of its defense forces as a consequence of applying the ballistic missile system. The SWOT analysis of Saudi Arabia ballistic missile conducted in this study revealed the following. Its strengths included the enhanced equipment and infrastructure ensured by the use of a BMD system, a strong defense system, and limited degradation of the environment. The weaknesses included the lack of proper training of Saudi Arabia's forces, the potential of developing a false sense of the country's security, the high cost of the system, malfunction, and high reliance on such allies as the United States. The opportunities that were identified included the capability of using ballistic missiles and the establishment of state manufacturing plants. The key threats that were identified included the lack of clear lines of responsibility and accountability,

intensified arms race in the Middle East, and the potential of the transformation of TBM into weapons of terror.

The review of the available literature on Jordan BMD revealed the following. Jordan's BMD was developed with the intention of providing the country with protection from possible missile attacks from its enemies. The role of the United States in Jordan's BMD has entailed providing this nation with TBMs and associated capabilities. In addition, the U.S. has also provided Jordan with a significant funding with the view to assisting in the development of Israel's missile defense system. This issue was vital because it also extended over to cover Jordan. The U.S. rivals played a critical role in Jordan's BMD; in such a manner, they were responsible for the escalation of the conflict in the Middle East, which resulted in the use of missiles. The role of Jordan in its own BMD was essential and allowed the government to protect itself against any attacks. The SWOT analysis of this BMD indicated the following. The key strengths that were identified included the absence of any active conflict, stable political environment, and membership in anti-missile organizations, the Royal Jordanian Army, strategic location, and the U.S. support. The weaknesses that were identified in the analysis included the geographic location, limited resources of Jordan that limited its ability to develop the own missile defense system, the fact of being used by Israel in the Jordan Valley that Israel utilizes for its own BMD system, and the high refugee influx. Opportunities that were identified included the U.S. funding through foreign aid, stable political government, refugee influx that allowed asking for the financial aid from the international community, and an alliance with the United States. The key threats associated with the BMD included possible attacks by the U.S. enemies and terrorist groups, the lack of guaranteed security, and economic strain as a result of the high refugee influx into the country that made it difficult for the country to cater to the needs of the population effectively.

Chapter IV reiterated the key research questions of the study and identified the key aspects in the available literature on TBMD in the Middle East. The chapter summaries these issues. Finally, it also explained the results of the study as evidenced in the discussion section of the paper.

## **B. IMPLICATIONS OF THE STUDY**

This study has a number of implications. One of the key implications is associated with the expansion of knowledge regarding TBMD in the Middle East. This study has been fundamental in providing more information about these types of missiles in this region. It notes various parties possessing TBM in the region and the danger that they pose to the rest of the nations in the region, including Israel, Saudi Arabia, and Jordan. Additionally, it provided essential knowledge regarding the acquisition of these missiles and their technology. Therefore, this study provided useful information regarding the high missile proliferation in this region and what it means for the local countries.

Another essential implication is connected with the role of a TBMD system in facilitating the security of nations. This study's investigation of Israel, Saudi Arabia, and Jordan and the potential of their coming together to develop a joint and integrated TBMD system. The three nations face a myriad of adversaries, in part, because of their close ties with the United States both inside and outside the region. This study showed how a joint TBMD system could provide Israel, Saudi Arabia, and Jordan with defense from all these enemies by ensuring a much stronger protection than they could achieve on their own. They could work together both from the resources perspective in the TBMD development. Additionally, cooperating for the development of a TBMD system involves a high level of trust in the intentions and objectives the other nations involved.

## **C. POLICY RECOMMENDATIONS**

This study seeks to provide a means by which Israel, Saudi Arabia, and Jordan could be able to develop an integrated TBMD system to facilitate their security in a region that is in the constant turmoil. The findings of this study are incorporated into the following policy recommendations for the development and implementation of a tailored TBMD system for Israel, Saudi Arabia, and Jordan.

First, this study recommends that an integrated TBMD system for Israel, Saudi Arabia, and Jordan should include a combination of command, battle management, control, and communication system. Such a system should be built based on the cooperation. In addition, the countries should have frequent joint missile defense exercises. This would

require establishing a coalition center in one of the three states and include U.S. participation. This center would be useful in fostering the creation of trust and confidence with foreign operators.

In addition, this study recommends a multilateral framework to help Jordan, Israel, and Saudi Arabia develop and implement the TBMD system. It is especially significant given the limited reaction time, the degree of mobility of looming threats, and difficulties associated with the engagement geometry. In this case, cooperation is the most viable option for the successful fight against the present possible future threats for Israel, Saudi Arabia, and Jordan. Therefore, the suggested system should comprise a thorough integration of control, command, and communication structures. In addition, it should also use the cooperative sharing of intelligence surveillance, and information needs that is to be used in countering any potential attacks. This study also recommends the three countries preplan clear response measures to various scenarios. Their system operators should be well trained should have a clear understanding of preplanned responses.

Another useful recommendation is to share in research and development among the three states. This could be a beneficial opportunity in regard to the future of TBMD technologies in both the short-and long-term. More so, with each of these countries contributing to research and development financially, it would be easier to develop the TBMD capabilities instrumental in protecting themselves effectively. This would also play a helpful role in enhancing the level of cooperation between the countries.

An additional policy recommendation of this thesis is to use a phased adaptive approach in the implementation of the system. Accordingly, Jordan, Israel, and Saudi Arabia should consider several things. First, they should consider the potential difficulty associated with the data sharing with other TBMD systems. Therefore, the states of Israel, Saudi Arabia, and Jordan need good relations with each other for sharing such information, which can prove to be sensitive. Therefore, all three states must show that they are ready to adopt the idea.

These countries should also consider the potential collateral damage that may be caused by the actual use of a TBMD system. This issue is even more significant if such

damage relates to political and culturally sensitive matters, and thus the states need to holistically and effectively address these issues before the implementation defense TBMD system. For example, the potentially problematic issues could be addressed through planning seminars and workshops, which would provide policymakers, defense analysts, military personnel, diplomats, and other stakeholders with an opportunity to identify key ways of addressing the named issues. Such an approach would improve the prospects of success for the system.

As the final policy recommendation, this study recommends the countries promote allied participation at all the key stages of the development of the TBMD system, including its testing and fielding. Because this system would impact the alliance three states have formed, the system has the potential to influence the alliance as a whole as opposed to individual states. Therefore, all the key governments must be involved in the development of the defense system.

#### **D. RECOMMENDATIONS FOR FUTURE STUDIES**

This study used secondary research design to investigate the possibility of developing a joint and integrated TBMD system to provide protection to Israel, Saudi Arabia, and Jordan. It involved exploring this issue by assessing the key aspects of it in the secondary literature. While this approach proved to be useful in discovering what is known on these issues, it meant that much of what the researcher found was conducted by other researchers. There is a possibility that the information might be not adequate given that the researcher did not take part in the initial studies. Therefore, future studies should be conducted using a primary research design. Specifically, a qualitative research would be the most preferable approach, one with interviews held with experts in the field of missile defense and diplomats who could explain relations between nations if they join forces to develop a TBMD system.

Furthermore, this study has demonstrated the high dependence of not only Israel, Saudi Arabia, and Jordan but also the majority of the Middle East nations on foreign powers for their missiles, related technology, and research. On the one hand, the adversaries of these three states depend on Russia, North Korea, and China for their missiles. On the other

hand, Israel, Saudi Arabia, and Jordan depend on the United States for their missile defense. Consequently, it would be interesting for future research to investigate the influence of this dependability on the capability of these nations to defend themselves. In addition, other key aspects of future research are ways of limiting this dependency. For example, there should be research on the way nations could advance their technology instead of solely depending on the United States. The investigation should consider the possibility of this scenario and the effect that this capability can have on the development of a missile defense system for these states. At the same time, another key perspective for the research should consider the influence of this freedom and capability on the U.S. relations with these nations. This would lead to a clearer understanding of how a TBMD system would go a long way into guarding these countries from missile attacks in the best ways possible.

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